

# THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

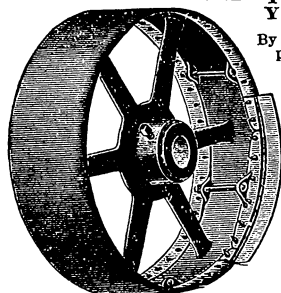
Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

Vol. LIV: No. 19. New York, Thursday, November 8, 1894.

\$4.50 a Year, including Postage.  
Single Copies, Ten Cents.

Reading Matter Contents.....page 832  
Classified List of Advertisers.... " 97  
Alphabetical Index to Advertisers " 101  
Advertising and Subscription Rates " 839

## SAVE YOUR POWER YOUR BELTS, YOUR MONEY



By covering your  
pulleys with  
**SHULTZ**  
Patent  
Leather  
Pulley  
Covering  
Send for Circular  
to  
**SHULTZ BELTING**  
CO.,

ST. LOUIS, MO.  
NEW YORK, N.Y., 113 Liberty St., A. B. Laurence, Mgr.  
BOSTON, MASS., 164 Summer St., G. J. Kelley, Mgr.  
PHILADELPHIA, PA., 129 N. 3d St., J. Garnett, Mgr.

## VALLEY STEEL CO.,

ST. LOUIS.  
Manufacturers of

## STEEL CUT NAILS.



Every Steam Plant  
Should be provided with  
**BRISTOL'S RECORDING  
PRESSURE GAUGE.**

Low in Price and Guaranteed.  
Send for circulars and fac-simile  
chart.

**THE BRISTOL CO.,**  
Waterbury, Conn.

## BRAIDED CORD.



Samson and Massachusetts Brands.

Send for Samples.

**SAMSON CORDAGE WORKS, Boston, Mass.**

**TURNBUCKLES.**

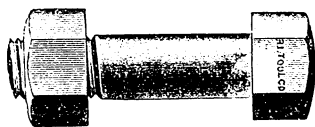


BRANCH OFFICE: 136 Liberty St., New York.  
Cleveland City Forge and Iron Co., Cleveland, O.

**BE SURE** You sell the best  
Glue it is possible  
to make by selling only

**DODD'S LIQUID  
GLUE.**

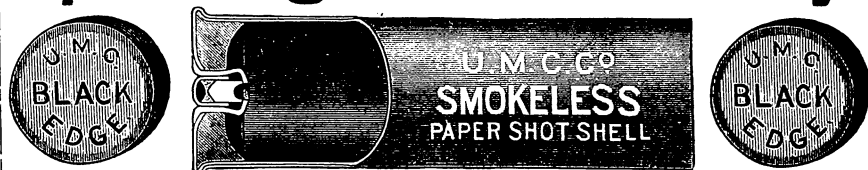
## RHODE ISLAND TOOL CO.,



PROVIDENCE, R. I.



## Ammunition Sporting and Military.



**PAPER SHOT SHELLS, Etc**

**The Union Metallic Cartridge Co.,**  
BRIDGEPORT, CONN.

ASK YOUR DEALER FOR U. M. C. GOODS.

## RANDOLPH & CLOWES,

WATERBURY, CONN.,

Manufacturers of Seamless Drawn Brass and Copper Tubing and Large Shells, Brazen  
Tubes and Mouldings, Sheet Brass, Sheet Copper, German Silver.

—SOLE MANUFACTURERS OF—

## Brown's Patent Seamless Drawn Copper House Boilers.

**CANNOT COLLAPSE. WILL NOT LEAK.**

Ordinary weight tested to 200 lbs., extra heavy to 300 lbs. pressure per square inch. Made of two Seam-  
less Drawn Copper Shells. Handsomest, best and strongest and safest boiler in the market and cheapest in  
the end. Send for circular and instructions to prevent accidents from freezing, &c., &c.



We claim the follow-  
ing Merits for

## JENKINS BROS.' VALVES:

1. They are Mechanically Made
2. They have improvements that no other valves have.
3. The Metal is in the right place.
4. Nothing but the best Steam Metal is used.
5. All parts are interchangeable.
6. Every Valve Tested before leaving the manufactory.

**JENKINS BROTHERS,**

New York. Chicago. Philadelphia Boston.



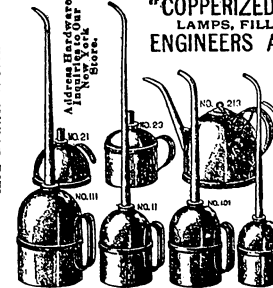
**The Willmot & Hobbs Mfg. Co.,**

BRIDGEPORT, CONN.

WE sell through the trade and principally to advan-  
ce the our Wonderful Hot and Cold Rolled "Swedish"  
Steel for Stamped, Drawn and Flat Work.

Annual Capacity 15,000  
tons.

ESSEMER, OPEN HEARTH,  
and the Celebrated and Unrivalled  
"SWEDISH" STEEL  
(REGISTERED TRADE-MARK)  
Hot Rolled and Cold Rolled  
For Pressed, Stamped  
and Drawn Work.



MAIN OFFICE, MILLS AND FACTORIES AT  
**BRIDGEPORT, CONN.**

STORE, 514 MURRAY ST., NEW YORK.

(CONSTRUCTED BY TELEPHONE.)

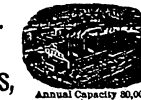
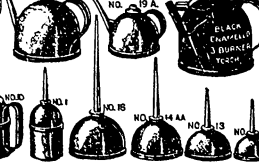
THE LARGEST AND MOST COMPLETE LINE OF NICKEL PLATED ALSO

"COPPERIZED" STEEL OILERS,

LAMPS, FILLERS, TALLOW POTS, TORCHES,

ENGINEERS AND STEAMBOAT SETS, ETC.

Are CHEAP, DURABLE and ELEGANT and are all  
heavily Electro-Copper Plated inside to prevent  
rusting and the Oil from becoming dirty. The Out-  
side of the "Copperized" Oilers perfectly Resembles  
Burnished Copper. Buy the best—cheapest in the  
end. Send for Catalogue "C."



Annual Capacity 20,000  
tons.

**BRIGHT COLD ROLLED  
STEEL**  
—FOR ALL KINDS OF—  
Stamping and  
Plating Purposes.

## Rainey Connellsville Furnace and Foundry Coke.

The only Coke you can buy and know you are getting the best that can be manufactured. All our works in  
the heart of the Region, within four miles of Connellsville, Pa.

**CAPACITY 4,000 TONS DAILY.**

**W. J. RAINEY,** MAIN OFFICE: **CLEVELAND, OHIO.**  
Mercantile Bank Building.

THE  
**ANSONIA BRASS**  
AND **COPPER CO.**  
MANUFACTURERS OF  
**BRASS AND COPPER**  
Seamless Tubes, Sheets, Rods and Wire.

**Ingot Copper.**

SOLE MANUFACTURERS

**Tobin Bronze**  
(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,  
Square and Hexagon Bars, for Pump  
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York.

THE  
**New Haven Copper Co.,**  
SOLE MAKERS OF

**POLISHED COPPER**

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND  
DEALERS IN

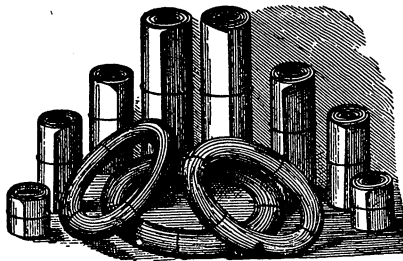
**BRAZIERS' & SHEATHING COPPER,**

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



**Waterbury Brass Co.**

Established 1845.

**Sheet, Roll and Platers' Brass,**

German Silver, Copper, Brass and Ger-  
man Silver Wire, Brass and  
Copper Tubing.

**COPPER RIVETS AND BURS  
PERCUSSION CAPS,  
TAPE MEASURES,**

**METALLIC EYELETS,**  
Brass Kettles, Brass Tags, Powder Flasks,  
Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION.  
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or  
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S  
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Provi-  
dence, R. I. 38 Mechanic St., Newark, N. J.  
MILLS AT WATERBURY, CONN.

WHEN IN WANT OF  
ANYTHING IN

**BRASS  
AND  
COPPER**

WRITE

**ROME BRASS & COPPER CO.,**  
ROME, N. Y.

**THE PLUME & ATWOOD MFG. CO.**

MANUFACTURERS OF

**Sheet and Roll Brass**

—AND—

**WIRE,**

GERMAN SILVER AND GILDING METAL.  
COPPER RIVETS AND BURS, COP-  
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,  
Kerosene Burners, Lamp  
Trimmings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,  
THOMASTON, CONN.

FACTORIES:  
WATERBURY, CONN.

**SCOVILL MFG. COMPANY,**  
Manufacturers of

**BRASS**

Sheet, Wire, Tubes.

**BUTT HINGES,  
BUTTONS,  
LAMP GOODS,  
NOVELTIES,  
PURE ALUMINUM**

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

423 Broome Street, New York.  
210 Lake Street, Chicago.  
84 Summer Street, Boston.

**JOHN DAVOL & SONS,**

AGENTS FOR

**Brooklyn Brass & Copper Co.,**

DEALERS IN

**COPPER, TIN, SPELTER,  
LEAD, ANTIMONY.**

100 John Street, - New York.

**WILLIAM S. FEARING.**

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

*Sheet Brass, Fancy Sheet Brass,  
German Silver, Copper, Brass  
and German Silver Wire,  
Brazed and Seamless Brass and  
Copper Tubes, Brass and Cop-  
per Rods, Brass Ferrules,  
Pure Copper Wire;  
Sheet and Ingot Copper; Spelter,  
Tin; Antimony, Lead; &c.*

ACID RESISTING

**Deoxidized  
Bronze,**

Copper or Brass, also Aluminum, Phosphor Bronze  
and Compositions of all kind in Ingots,  
Wire Bars and Castings.

Large Castings a Specialty.  
Babbitt Metals.

**BRIDGEPORT DEOXIDIZED BRONZE  
and METAL CO.,**

Bridgeport, Conn.

**MATTHIESSEN & HEGELER ZINC CO.,**

LA SALLE, ILLINOIS,

**SMELTERS OF SPELTER.**

AND MANUFACTURERS OF

**SHEET ZINC AND SULPHURIC ACID.**

Special Sizes of Zinc cut to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

**ZINCS FOR LECLANCHE BATTERY.**

**BRASS GOODS MFG. CO.,**

Mfrs. of Stamped Brass, Silver and Nicked Goods, Brass Labels for Cans and Rubber Moulds.

**BRONZE DOOR KNOBS**

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin  
Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.



MANUFACTURERS OF

Drop Hammers, Turnbuckles and Paral-  
lel Vises.

MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N.Y.

**HENDRICKS BROTHERS,**

Proprietors of the

**Belleville Copper Rolling Mills,**

Manufacturers of

**Braziers', Bolt and Sheathing**

**COPPER.**

**COPPER WIRE AND RIVETS.**

Importers and Dealers in

**Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.**  
49 CLIFF ST., NEW YORK.



**ELEPHANT  
BRAND**



**PHOSPHOR-BRONZE**  
INGOTS, CASTINGS, WIRE, SHEET &C.  
THE PHOSPHOR BRONZE SMELTING CO. LIMITED  
2200 WASHINGTON AVE. PHILADELPHIA, PA.  
ORIGINAL MANUFACTURERS OF PHOSPHOR-BRONZE IN THE UNITED STATES AND SOLE MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

**PHOSPHOR  
BRONZE.**

## Parsons' Manganese Bronze and White Brass.

MADE IN THE UNITED STATES EXCLUSIVELY BY

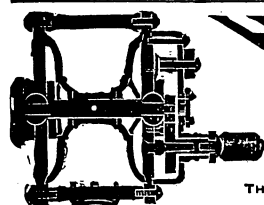
**THE WILLIAM CRAMP & SONS SHIP and ENGINE BUILDING CO.,  
PHILADELPHIA, PA.**

**MANGANESE BRONZE PROPELLERS**  
—ARE USED BY THE—

Cunard, Pacific Mail, Hamburg American, White Star, International, Morgan, Canadian Pacific, North German Lloyds and many other Steam Ship Companies, and principal Naval Powers.

**Parsons' White Brass; the Most Approved Anti-Friction Metal.**

G. DOUGLAS PETRIE, Agent, Nos. 39 & 41 Cortlandt Street, New York.



**HENDRYX**  
Solicits Correspondence about  
Fishing Reels for 15 Cents to 20 Dollars each.  
Brass Bird Cages "50" "12" "  
Japanned "25" "10" "  
Standard Bronze, Brass and Steel Chain.  
Standard Wire Picture Cord.

THE ANDREW B. HENDRYX CO., NEW HAVEN, CONN., U. S. A.



**THE F. L. GAYLORD CO.,**

MANUFACTURERS OF

Heavy and Light Brass, Bronze, Composition and Pure Aluminum Castings.

THOS. L. FOWLER & CO., Agents, 55 Fulton St., New York City.

## CROWN SMELTING COMPANY,

Chester, Pa.

**Bronze, Brass and Composition Castings.**

Inventors and Sole Manufacturers of

**"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."**

Manufacturers of PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.

Specifications in ingot metal or castings.

**The W. W. & R. M. KEYS CO.,**

Bronze,  
Composition  
and  
Brass  
Castings  
of all kinds,  
also  
Babbitt  
Metals.

**BRIDGEPORT, CONN.**



Guaranteed  
Best Anti-Friction Metal for all machinery bearings.  
For high speed and heavy crushing weight it has no equal. It is used on bearings where no other known metal will stand.

Theo. Hertz & Son, Sole Mfrs.,  
30th St. and Park Ave., St. Louis, Mo.

Manufacturers all grades Babbitt Metals, Solder, Bar Tin, Bar Lead, Lead Car Seals, etc.

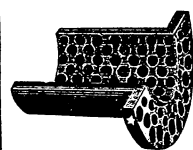
**Boston Casting Co.,** 122 W First St.,  
So. Boston, Mass.

MANUFACTURERS OF  
**WROUGHT IRON  
CASTINGS.**

We make sound, soft Wrought Iron Castings with a tensile strength of 60,000 to 70,000 pounds per square inch and guarantee the same to be expressly adapted for mechanical and electrical work. The castings will be true to pattern with a shrinkage of one quarter of an inch to the foot. This company is in no way connected with any other.

A

## OILLESS BEARINGS



For Loose Pulleys and other bearings. Perfectly clean. No cutting or danger of fire from overheating. Send for Loose Pulley circular.

North American Metaline Co.,  
43 to 49 Third Street,  
Long Island City, N. Y.

**THE CRAMP METAL MFG. CO.,  
OLNEY, PHILADELPHIA.**

**SHEET COPPER.**

PATENT LEVELED, TINNED,  
COLD ROLLED, POLISHED.

THE CRESCENT TRY IT!  
AND YOU WILL USE NO OTHER

**THE CRESCENT BRAND  
PHOSPHOR  
TIN.**

THE HIGHEST AND  
RICHEST GRADE MADE

MANUFACTURED ONLY BY  
**THE CRESCENT PHOSPHORIZED METAL CO**  
OFFICE AND WORKS  
2107 2109 and 2111 INDIANA AV. PHILADELPHIA, PA.

## PHOSPHOR-TIN

BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE OF PHOSPHOR BRONZE THEMSELVES BY THE SIMPLE PROCESS OF MELTING. MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET. NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS AND PRICES ADDRESS **HALK & NAUMANN** NEW-YORK  
SOLE AGENTS FOR THE U.S. AND CANADA. OFFICE 51 PEARL ST.

**The American Metal Co.**

(LIMITED),

Levin Building, 80 Wall St., New York.

P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.

TIN, LEAD, SPELTER, ANTIMONY, NICKEL,  
ALUMINUM, BULLION, IRON.

**Advances made on Consignments**

AGENTS FOR

Henry R. Merton & Co., London.  
Metallgesellschaft, Frankfurt-on-Main.  
Williams, Foster & Co., Ltd., Swansea.

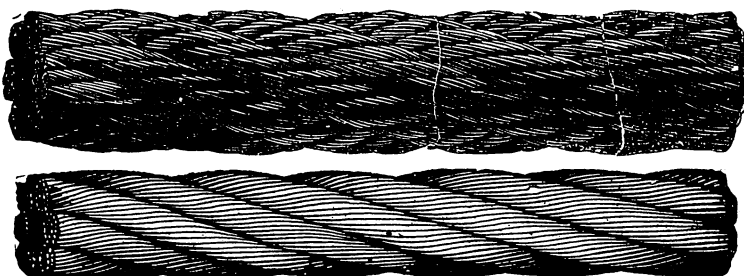
# Washburn & Moen Manuf'g Co.,

WORCESTER, MASS., NEW YORK CITY, CHICAGO.

MAKERS OF IRON, STEEL AND COPPER

EVERY VARIETY OF **WIRE** FOR ALL PURPOSES.  
**WIRE ROPE AND CABLE.**

Hard and Soft Drawn Copper Wire for Electrical Purposes; Galvanized Iron and Steel Telegraph and Telephone Wire; Gladden Patent Steel Barb Wire; Watch and Clock Main Springs; Eyeglass Springs; Steel Wire for Needles and Drills; Patent Steel Wire Bale Ties; Pump Chain; Two Strand Twisted and Flat Twisted Fence Wire without Barbs; Fence Staples, Stretchers, &c.; Bright, Annealed, Tinned and Galvanized and Copper Wire, on Spools 10s. to 1 lb



SEND FOR PRICE-LISTS, CIRCULARS AND DESCRIPTIVE PAMPHLETS.

New York Warehouses, 16 Cliff St., and 241 Pearl St. Chicago Warehouse, 107 & 109 Lake St. San Francisco Warehouse, 8 & 10 Pine St. Houston Warehouse, Houston, Texas.

Galvanized Iron Wire Rope for Ships' Rigging, &c. Galvanized Steel Wire Cables for Suspension Bridges. Transmission and Standing Ropes, Hoisting Ropes, Tiller Ropes, Switch Ropes, Copper, Iron and Tinned Sash Cord, Phosphor Bronze and Copper Wire Rope, Wire Clothes Lines, Picture Cord, Galvanized Wire Seizing, and all the Fixtures and Appliances required for use with the foregoing. The famous yachts Mayflower, Volunteer and Schem are all rigged with our Wire Rope.

**WM. MCFARLAND,**  
IRON FOUNDER,  
**TRENTON, - - N. J.**  
**Chilled Cast Wire DIES**  
A SPECIALTY.  
Any Size or Style Made at Short Notice.

**J. F. KAY,**  
PASSAIC, N. J.  
MACHINERY FOR MAKING OF  
WIRE STRAND AND ROPE.  
Winding, Stranding and Closing Machines, &c. Electric Wire and Cable Machinery. Hemp Rope and Cordage Machinery.  
Plans and Estimates.

ESTABLISHED 1845  
**DUNBAR BROTHERS**  
MANUFACTURERS OF  
**STEEL (OIL TEMPERED) SPRINGS**  
ALL KINDS OF  
**SMALL SPRINGS**  
MADE FROM  
SHEET STEEL & STEEL & BRASS WIRE  
**BRISTOL, CONN.**

## VADE MECUM.

A work of reference for the use of Architects, Architectural Iron Workers, Builders, Blacksmiths, Bookkeepers, Boiler Makers, Contractors, Civil, Mechanical, Hydraulic, Mining, Stationary, Marine and Locomotive Engineers, Foremen of Machine Shops, Firemen, Master Mechanics of Railroads, Master Car Builders, Machine Shop Proprietors, Machinery Jobbers, Machinery Salesmen, Machinists, Pattern Makers, Railway Superintendents, Railway Supply Agents, Roadmasters, Superintendents of Factories and Business Men generally.

Compiled and Arranged by

**D. B. DIXON,**

And with a most exhaustive Electrical Department by

**THOS. G. GRIER,**

A Prominent Specialist.

480 Pages, 8 1/4 x 5 1/4 Inches, Cloth, \$2.50.

Sent postpaid on receipt of price by

**DAVID WILLIAMS, Publisher and Bookseller,**  
98-102 Reade Street, New York.

**MORGAN SPRING CO.**  
Worcester, Mass.

**WIRE ROPE**  
FOR ALL PURPOSES.  
**IRON AND STEEL WIRE OF ALL KINDS.**  
**TRENTON IRON CO.**  
NEW YORK OFFICE: COOPER HEWITT & CO. 17 BURLING SLIP  
TRENTON, N. J.  
WIRE ROPE TRAMWAYS

**WIRE MCHNY.** **MORGAN CONSTRUCTION CO.,** **ROLLING MILLS**  
WORCESTER, MASS.  
Continuous and Belgian Rolling Mills, Wire Mill Machinery, Furnaces, Gas Producers, Cranes, Etc.

## SYRACUSE SMELTING WORKS,

—MANUFACTURERS OF—

**Highest Grades Anti-Friction Metals**  
**FOR ALL MACHINERY BEARINGS.**

Dealers in Block Tin, Lead, Antimony, Aluminum, Phosphor Tin, Copper and Brass Ingots, Refined Spelter.



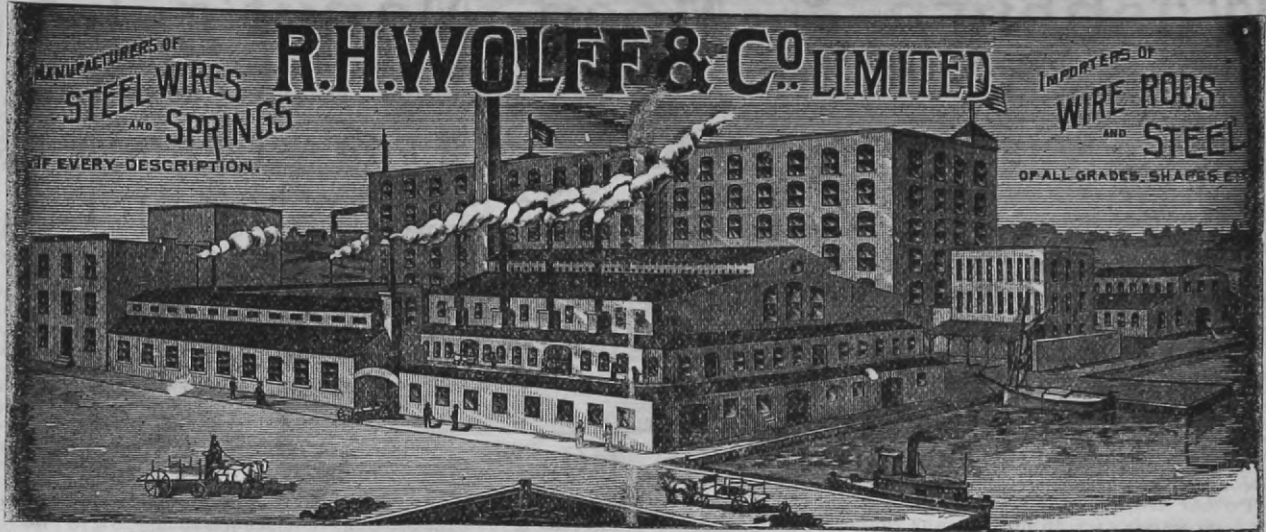
Also several grades of Solder, Stereotype and Needle Metals.

All Kinds of Brass, Bronze and Babbitt Castings made on short notice.

OFFICE AND WORKS:

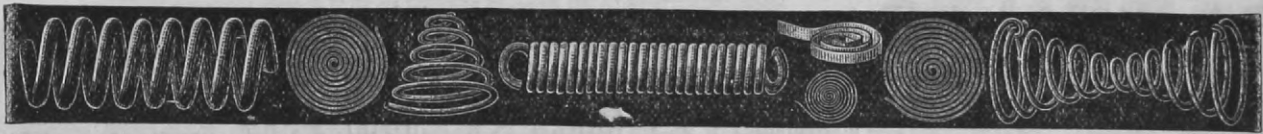
243 & 245 West Onondaga St., Syracuse, New York.

All metals manufactured by us are warranted to be as represented. Give us a trial and you will use no other metal but ours. Special discounts given to jobbers and large consumers.



117th to 118th Street and Harlem River.

General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

## STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Look, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Bralded and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

## SUPERIOR STEEL COMPANY, PITTSBURG, PA.

—MANUFACTURERS OF—

## HOT and COLD ROLLED STEEL,

IN WIDTHS UP TO 10 INCHES, AND IN EXACT THICKNESSES FROM .0025 INCH TO 4 INCH IN BESSEMER, OPEN HEARTH, SWEDISH, AND IN NICKEL AND CRUCIBLE CAST STEEL OF ALL DESCRIPTIONS, FOR SEWING MACHINE, BICYCLE AND TYPEWRITER PARTS, KEYS, CHAINS, CUPS, BELLS, KNOBS, FERRULES, AND HIGHEST GRADES OF SPRING STEEL FOR PENS, CLOCK SPRINGS AND WATCH MAINSPRINGS.

—AGENCIES:—

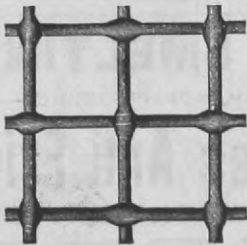
ELY & WILLIAMS,  
No. 38 Park Row, New York.

No. 1239 Market St., Philadelphia.

SAMUEL T. ROWLEY,  
No. 1030 Monadnock Building, Chicago.

## WIRE CLOTH and WIRE GOODS.

Hardware Grade Plain and Galvanized and Fanning Mill Wire Cloth, Poultry Netting, Heavy Window Screen Wire Cloth, Coal and Sand Screens, Riddles, Ash Sieves, &c., &c.



Office and Counter Railings, Elevator Enclosures, Wire Stall Guards, Hay Racks, Feed Boxes, Window Guards, Flower Stands, &c., &c.

SCHEELER &amp; SONS, - - - BUFFALO, N. Y.

VOLUTE,  
WIRE  
and  
FLAT STEEL.

## SPRINGS

for Agricultural Implements, Machinery and various other purposes. Write for prices to  
**SABIN MACHINE CO.,**  
MANUFACTURERS.  
MONTPELIER, VT.

## SPRINGS—RIVETS.

Specialties in

SHEET METAL WORK,  
CLOCK and INDICATOR POINTERS,  
CLARK & COWLES, Plainville, Ct.

## COBB & DREW, PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers, D. P. Tacks and Staples.  
New York Agency, James S. Henderson, successor to Disosway & Henderson, Hardware.  
Agents for Philadelphia Star Carriage and Tire Bolts.

Always  
Ask  
For



Unequaled for Strength  
and Durability.

Made Only by

Broderick & Bascom Rope Co.,  
St. Louis, Mo.

## HOWSON AND HOWSON

Counsellors at Law  
Solicitors of Patents

### PHILADELPHIA

Forrest Building, 119 S. 4th St.

### NEW YORK

Potter Building, 38 Park Row.

### WASHINGTON

Atlantic Building, 928 F St.

## PATENTS

U. S. and Foreign Secured.

Trade Marks and Copy Rights. Twenty Years' Experience. Send model or sketch and brief description of your invention for Free report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents," Free.

PATENT PRACTICE EXCLUSIVELY.  
References Furnished on Application.

E. B. STOCKING, Attorney at Law,  
611 F ST., N. W., WASHINGTON, D. C.

## CHARLES N. BUTLER, C.E.,

ATTORNEY IN PATENT CASES

641 Mutual Life Building,  
Tenth and Chestnut Sts., PHILADELPHIA, PA.

Formerly of the Examining Corps,  
U. S. Patent Office.

## PATENTS.

H. W. T. JENNER, Patent Attorney and Mechanical Expert, 608 F. St., Washington, D. C. Charges moderate. Write for terms. Established 1883.

## W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,

MANUFACTURER OF

## WIRE CLOTH

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c.,

—AND—

## WIRE WORK

For Bank, Office and Counter Railing, Store Fronts, Window Guards, &c.

Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.  
S T Pat. Adjustable Foundry Riddles.

S T SAND SCREENS.

SEND FOR CATALOGUE.

A Manual of Mining. Based on the course of lectures on mining delivered at the School of Mines of the State of Colorado. By M. C. IHLSENG, C.E., E.M., Ph.D., Professor of Engineering, Colorado State School of Mines; formerly of Columbia College School of Mines, New York City. CONTENTS: Geognosy; Preparatory and Explanatory work; Methods of Mining; Hoisting Machinery Electricity and Water Power; Hoisting operations; Hoisting Conveyances; Underground Traffic Surface Transportation; Pumping; Ventilation; Methods of Ventilation; Distribution of the Air; Regulation of the Air Current; Illumination; Hygienic Conditions; Shafts; Sinking in Running Ground; Timbering; Drifts, Tunnels and Adits; Boring; Breaking Ground; Blasting; Drills and Drilling; The Compression of Air; Mine Examination. 427 pages, cloth .. \$4.00

For sale by David Williams, 96-102 Reade St., N. Y.

## A. LESCHEN & SONS' ROPE CO.,

MANUFACTURERS OF

Trade-Mark.



Registered.

ST. LOUIS, MO.

All genuine Hercules Wire Rope is made with a red strand.



WAREROOMS: 87 Liberty St., New York. WORKS: Wilkesbarre, Pa.

## NEW HAVEN WIRE MFG CO.,

Manufacturers of **WIRE** in great variety

NEW HAVEN,

CONN.

THE STEWART WIRE COMPANY, - - Office and Works, EASTON, PENNA.

ANNEALED  
BRIGHT  
COPPERED  
RIVET

—ALL SIZES—

## WIRE

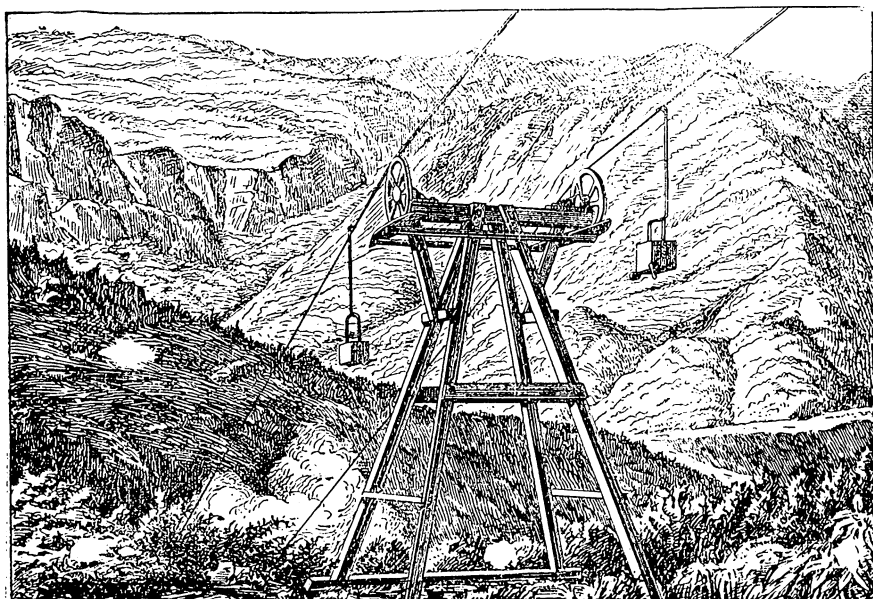
—ALL VARIETIES—

LIQUOR  
BRIGHT  
SPRING  
SCREW

New York Sales Office, 239 Broadway. Wire Straightened and Cut to Specified Lengths.

## CALIFORNIA WIRE WORKS.

509-511 MARKET STREET, SAN FRANCISCO, CAL.



Manufacturers of Wire Rope for Cable Railways and Mining Purposes.

## HALLIDIE'S PATENT WIRE ROPEWAY

Simplest and most economical means of transportation. Send for Illustrated Catalogue.



**HOWARD & MORSE**  
 45 FULTON ST.  
 NEW YORK.  
 HEAVY MINING  
 COPPER,  
 BRASS,  
 STEEL  
 OR  
 IRON  
 WIRE CLOTH.

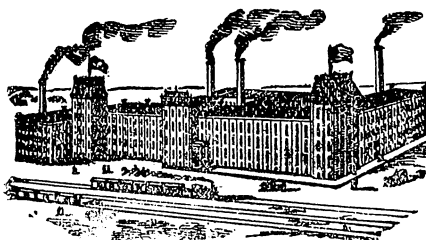
ALSO  
 MANUFACTURERS OF  
 GENERAL  
 WIRE WORK.  
 Window Guards,  
 Stable Fixtures,  
 RAILINGS,  
 Sand Screens  
 Coal Screens  
 Etc.

**PERFORATED SHEET METALS**  
 OF EVERY DESCRIPTION.



**THE HENDRICK MFG. CO., LTD.,**  
 CARBONDALE, PA.

**WICKWIRE BROTHERS,** CORTLAND, N. Y.  
 MANUFACTURERS OF  
 Wire Cloth and Wire Goods,



Coal Sieves,  
 Flour Sieves,  
 Corn Poppers,  
 Dish Covers,  
 Metallic  
 Coal Sieves.

**NEW PROCESS**  
**Cortland**  
**POWER LOOM**  
**WIRE CLOTH.**

Every roll wrapped in Pink Paper and has our name on label.

**Kilmer Manufacturing Co.**

—Newburgh, N. Y.

Manufacturers of

**BALE TIES**

For Baling  
 Hay, Straw,  
 Rags,  
 Excelsior, &c.

ALSO WIRE RODS, BARB WIRE, COILED STEEL WIRE, WIRE STAPLES, GALVANIZED WIRE, ORNAMENTAL FENCING, &c., &c.

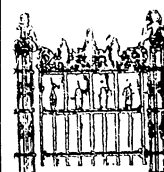
Western Warehouse, 543 and 545 State Street, Chicago, Ill.

Western Office, 21 Quincy Street, Chicago, Ill.

New York Office, 111 Water Street, New York City.

Works and General Office, Newburgh, N. Y.

**CHAMPION**  
**IRON CO.**



**SPECIALTIES.** — Iron Stairs and Jail Work, Builders' and Ornamental Iron Work, and the only manufacturers of Malleable Iron Cresting guaranteed against breakage; also manufacturers of the Celebrated Ohio Champion Iron Force and Lift Pumps. Send for 220-page Catalogue.

Largest Iron Fence and Railing Works in U. S.

**KENTON, O.**



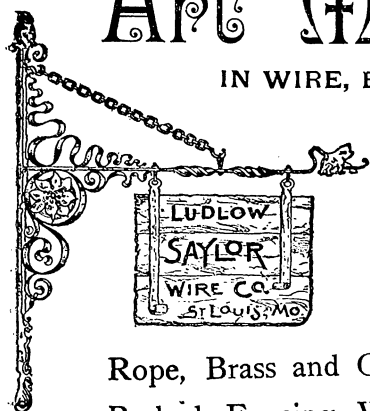
**Art Metal Works**  
 IN WIRE, BRASS and WROUGHT IRON.

**BANK AND OFFICE**  
**RAILINGS**

In Great Variety and of Handsome Designs.  
 ELEVATOR ENCLOSURES.

Iron and Wire Fences, Coal and  
 Ore Screens, Wire Cloth and Wire

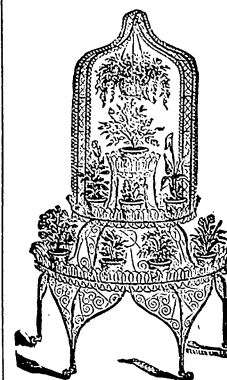
Rope, Brass and Copper Sheets and Tubing, Plain and  
 Barbed Fencing Wire. Send for Catalogue and name this Paper.



**THE VAN DORN IRON WORKS CO., Cleveland, Ohio.**



Office and Salesroom, 157 1/2 Euclid Ave.,  
 MANUFACTURERS OF  
**WROUGHT IRON FENCE and RAILING.**  
 Stable Fixtures, Crestings, Terminals, Wire Office and  
 Counter Railing, Lawn Seats and Vases.  
 Iron and Steel Jail Cell Work. Ornamental and Structural Ironwork.



Mention this Paper.

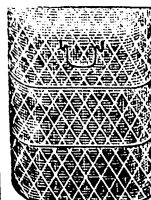
**FLOWER**  
**POT**  
**STANDS.**

Do you handle them?

It will pay you to  
 send for cata-  
 logue.

**WIRE and**  
**IRON WORK**  
 of every description.

**E. T. BARNUM,**  
 Detroit, Mich.



**WE** are the largest mfrs. of lined **SPARK**  
**GUARDS**

In the U. S. Write for prices.

**Dow Wire Works Co.,**  
 Louisville, Ky.

# CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

**Perforated Metals.** GALVANIZERS AND TINNERS OF **Wire Cloth and Nettings.**

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street.

## The Gilbert & Bennett Mfg. Co.

— MANUFACTURE —

**WIRE CLOTH, NETTING,**

Fencing, Gates, Fencing Tools,

**Wire Goods, Wire Work**

Stable Fixtures, Railings, Window Guards.

WIRE LATHING WITH HAMMOND'S METAL FURRING.

44 Cliff Street,  
**NEW YORK.**

148 Lake Street,  
**CHICAGO.**

Factories, { GEORGETOWN, CONN.  
CHICAGO, ILLINOIS.

ESTABLISHED 1818.

Pearl Window Screen Wire Cloth.  
Galvanized Steel Wire Cloth.  
Galvanized Wire Poultry Netting.  
"Cottage" Lawn & Garden Fencing.  
"C. & B." Web Wire Fencing.  
Sieves, Riddles, Screens.  
Gilbert's Rival Ash Sifters.  
House Furnishing Wire Goods

## WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



NEW PROCESS  
**HARD STEEL WIRE CLOTH AND NETTING**

GALVANIZED  
**WIRE NETTING.**

Painted Window Screen Wire Cloth,

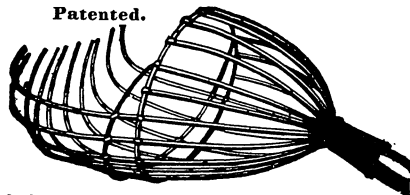
WIRE LATHING, HOUSE FURNISHING WIRE GOODS.

Patented March, 1884.

Patents Pending.

SEND FOR LATEST CATALOGUE.

## "PENNSYLVANIA" FRUIT PICKER.



This Cut almost speaks for itself—the device being so much like the human hand shows at once the utility of the article.

**AS A FRUIT PICKER IT HAS NO SUPERIOR.**

It is made of Heavy Galvanized Wire, and Easily Adjusted to a Pole. It has been sold for several years, and the demand (as it is becoming known) is steadily increasing. The difficulty of detaching fruit and securing it unbruised is apparent to everyone so engaged. This overcomes the difficulty, and saves the finest fruit, which commands the highest prices.

**THE LOW PRICE AT WHICH IT IS SOLD.**

brings it within the reach of those who have but little fruit to gather as well as those who have large quantities. Price, per dozen, \$6.00. Liberal discount to dealers. It will gather Apples, Peaches, Pears, etc.

Manufactured by **Pennsylvania Wire Works,**  
**EDWARD DARBY & SONS,** 233 & 235 Arch St., Philadelphia, Pa

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS  
**THE ROEBLING  
STANDARD  
WIRE  
LATHING.**

**NEW JERSEY  
WIRE CLOTH CO.**

**"JERSEY"  
POULTRY  
NETTING  
AND FARM  
FENCING.**

TRENTON, 117 and 119 LIBERTY STREET,  
NEW JERSEY.

NEW YORK.

171 and 173 LAKE STREET,  
CHICAGO.

25 and 27 FREMONT STREET,  
SAN FRANCISCO.

## METAL PLATE WORK, Its Patterns and Their Geometry.

Also notes on metals and rules in mensuration for the use of tin, iron and zinc plate workers, &c.

By C. T. MILLIS. Second edition, revised and enlarged. 377 pages, 314 illustrations.

12mo, Cloth. . . . \$3.50.

Sent, postpaid upon receipt of price by **DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.**



Perforated Filter  
Press Plates.



BRONZE SCREEN PLATES  
To withstand action of  
ACIDULATED WATERS.

**PERFORATORS OF STEEL, IRON, COPPER, ZINC, BRASS AND TIN.**

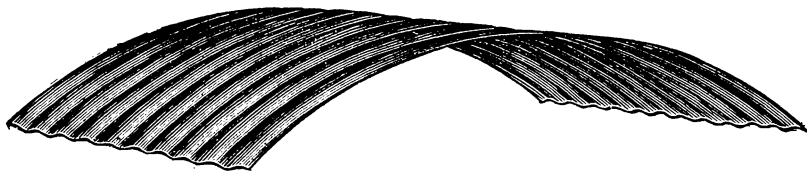
GRAIN CLEANING AND MINING MACHINERY,  
WOOLEN, COTTON, PAPER AND PULP MILLS,  
RICE, FLOUR AND COTTON SEED OIL MILLS,  
SUGAR AND MALT HOUSES,  
DISTILLERIES, FILTER PRESSES,

FOR USE IN  
STONE, COAL AND ORE SCREENS,  
BRICK AND TILE WORKS, FILTERS,  
SPARK ARRESTERS, GAS AND WATER WORKS,  
OIL, GAS AND VAPOR STOVES,  
COFFEE MACHINERY, ETC., ETC.

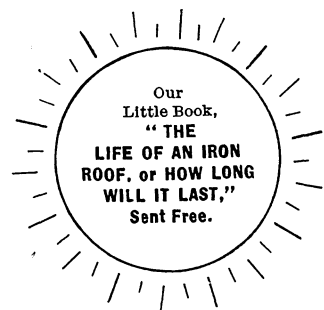
STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A. Eastern Office, No. 284 Pearl St., New York.

Curved Roofing  
Sheets. ✱



Made of Iron or Steel.  
We give special attention  
to exactness in this kind  
of work and have a large  
patronage from the leading Arch.  
Iron Works, Bridge Works, Builders  
and Contractors.



The Cincinnati Corrugating Co.,  
Box 312, Piqua, Ohio.

**The New York Iron Roofing and Corrugating Co.**  
Finest and Largest Variety of Sheet Metals. Products manufactured in the U.S. **FIRST & WASHINGTON STS. JERSEY CITY, N.J.**

**NEW YORK WIRE CLOTH CO.,**

102 CHAMBERS ST., NEW YORK.

WORKS LOCATED AT

York, Pa.; Brooklyn, N. Y.; Homer, N. Y.; Hamilton, N. Y.

—MANUFACTURERS OF—

**Painted, Hard Steel, Wire Screen Cloth.**

DOUBLE SELVAGE, STANDARD QUALITY.

Owners of the following well known brands of Hard Steel Wire Cloth:

YORK WIRE CLOTH CO., York, Pa.,

J. H. DE WITT'S SONS, Brooklyn, N. Y.,

THE WIRE FABRIC CO., Homer, N. Y.,

HAMILTON WIRE CLOTH CO., Hamilton, N. Y.,

And the DIAMOND Brand.

Corrugated, and all Other Shapes of Iron  
Roofing and Siding.



Iron Buildings, Roofs, Doors, Shutters, Cornices,  
Skylights, Bridges, &c.

**MOSELEY IRON BRIDGE AND ROOF CO.,**  
Office 5 Dey Street, Room 13, NEW YORK.

**SPECIAL** Particular attention given to  
production of goods adapted to  
special lines of business. Dupli-  
cating samples a specialty.

**WIRE**

**TACKS**

and

**NAILS.**

**Taunton Wire Nail Co.,**  
Taunton, Mass.

THE CELEBRATED  
**"SILVER FINISH"**

GALVANIZED POULTRY NETTINGS.

FOR SALE BY THE HARDWARE TRADE.

GET THE BEST.

**THE**  
**WIRE GOODS COMPANY,**  
Worcester, Mass.

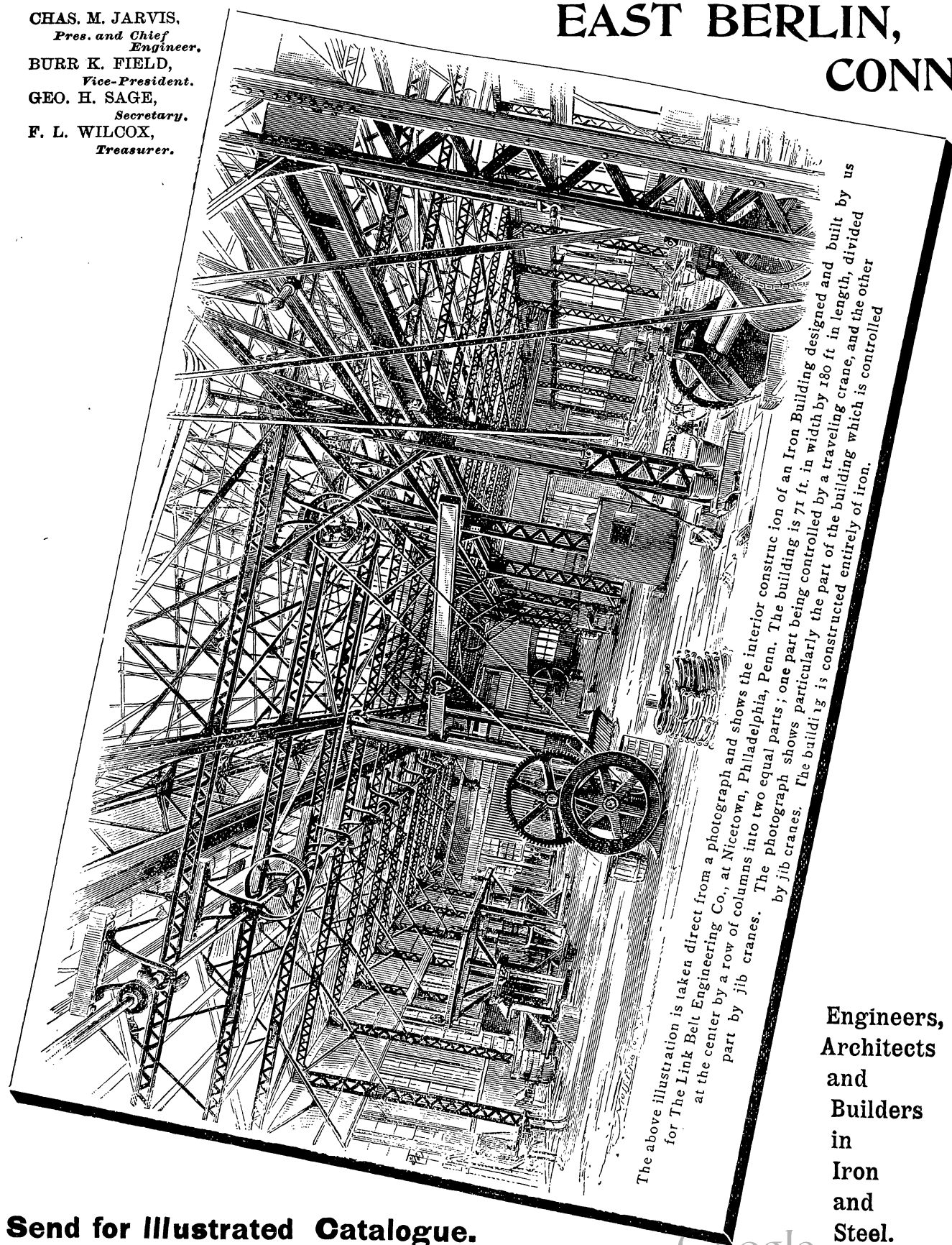
Hardware and Kitchen Wire Goods. Special-  
ties to order. Everything  
in Wire.

# THE BERLIN IRON BRIDGE Co.,

OFFICE AND WORKS,

EAST BERLIN,  
CONN.

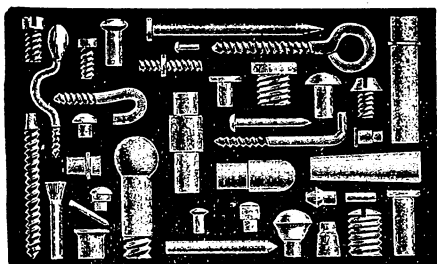
CHAS. M. JARVIS,  
*Pres. and Chief Engineer.*  
BURR K. FIELD,  
*Vice-President.*  
GEO. H. SAGE,  
*Secretary.*  
F. L. WILCOX,  
*Treasurer.*



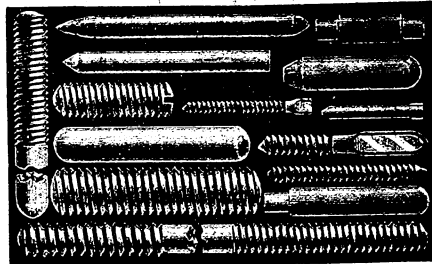
The above illustration is taken direct from a photograph and shows the interior construction of an Iron Building designed and built by us for The Link Belt Engineering Co., at Nicetown, Philadelphia, Penn. The building is 71 ft. in width by 180 ft. in length, divided by the center by a row of columns into two equal parts; one part being controlled by a traveling crane, and the other part by jib cranes. The photograph shows particularly the part of the building which is controlled by jib cranes. The building is constructed entirely of iron.

Engineers,  
Architects  
and  
Builders  
in  
Iron  
and  
Steel.

Send for Illustrated Catalogue.



Iron and Brass Rivets,  
STUDS, PINS,  
SCREWS, &c.,  
For Manufacturers of Light Hardware.  
**BLAKE & JOHNSON,**  
WATERBURY, CONN.



## NEW CASTLE WIRE NAIL CO.,

MANUFACTURERS OF



**WIRE RODS AND WIRE.**

Office and Works,

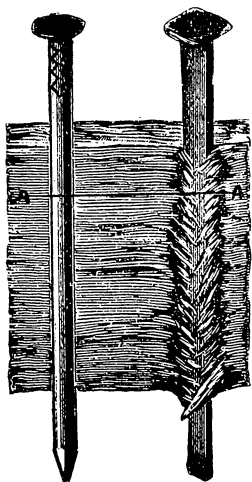
**NEW CASTLE, PA.**

## CINCINNATI BARBED WIRE FENCE COMPANY,

Manufacturers of  
**BARBED  
ANNEALED  
GALVANIZED  
BALING**

# WIRE

**NAILS.  
GOODS.  
STAPLES.  
BALE TIES.**  
CINCINNATI, O.



## THE SALEM WIRE NAIL CO.

—MANUFACTURERS OF—

**STEEL WIRE NAILS, FENCE STAPLES,  
ANNEALED and GALVANIZED WIRE.**

Works: SALEM, O.; FINDLAY, O.

General Office: - SALEM, OHIO.

BRANCH OFFICES:

Room 32, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

Osgood & Howell, 132 Market St., San Francisco, Cal.

## THE BOND NAIL.



These nails are made from different sizes of wire with head at any desired position between the points. For coopers, box and furniture manufacturers' dowels, they are unsurpassed. Builders and repairers of all kinds will find these nails useful. We also manufacture Doweling Machines and Sets for driving these nails.  
Address

## THE BOND NAIL CO.,

P. O. Box 23,

**RAYNHAM, MASS.**



## REYNOLDS & CO.

MANUFACTURERS OF

**SET, CAP AND MACHINE SCREWS,**

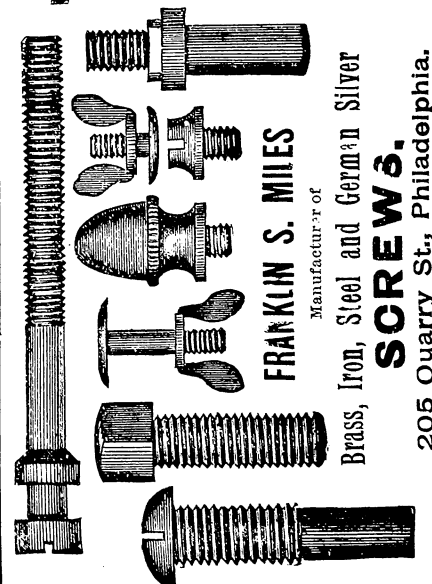
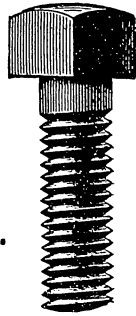
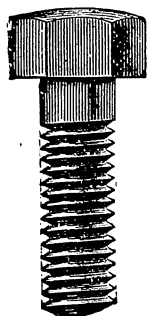
Studs, Coupling Bolts, Stove Bolts, Finished Nuts, &c.



Also Hand and Draw-plate Moulding Machines for Foundry Use.

**NEW HAVEN, CONN.**

SEND FOR CATALOGUE.



FRANKLIN S. MILES

Manufacturer of

Brass, Iron, Steel and German Silver

**SCREWS.**

205 Quarry St., Philadelphia.

## WEST'S MOULDERS' TEXT BOOK

BEING PART II. OF AMERICAN FOUNDRY PRACTICE,

Giving the best methods and rules for obtaining good castings, with detailed description for making moulds. A thoroughly practical book that should be in the hands of every moulder.

PRICE, - Cloth, - 460 Pages, - - \$2.50.

SENT POSTPAID, ON RECEIPT OF PRICE, BY

DAVID WILLIAMS, Publisher and Bookseller. - 96-102 Reade Street, New York.

**BORDEN & LOVELL,**  
70 AND 71 WEST STREET  
NEW YORK.

Steel, Iron and Wire Nails.

**ATLAS TACK CORPORATION.****508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

**BRANCHES:** { **DUNBAR, HOBART & CO., WHITMAN, MASS.** ESTABLISHED IN 1810. **LORING & PARKS, PLYMOUTH, MASS.** ESTABLISHED IN 1842.  
**A. FIELD & SONS, TAUNTON, MASS.** ESTABLISHED IN 1827. **CONSOLIDATED 1891.** **TAUNTON TACK CO., TAUNTON, MASS.** ESTABLISHED IN 1854.  
**AMERICAN TACK CO., FAIRHAVEN, MASS.** ESTABLISHED IN 1867. **OLD COLONY RIVET CO., PLYMOUTH, MASS.** ESTABLISHED IN 1866.

**MANUFACTURERS OF**

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well-known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York Store and our factories.

**MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.****BRANCH OFFICE & WAREHOUSE, 31 WARREN ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 193 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 339 MARKET ST., PHILADELPHIA, PA.****BRANCH OFFICE & WAREHOUSE, 14 WEST GERMAN ST., BALTIMORE, MD.****GRAND CROSSING TACK CO.,****GRAND CROSSING, CHICAGO, ILL., U. S. A.**

Tacks and Small Nails, Wire Nails and Brads, Double Pointed Tacks and Staples, Lining and Saddle Nails, Slating and Roofing Nails, Brass and Iron Shoe Nails and Special ties.

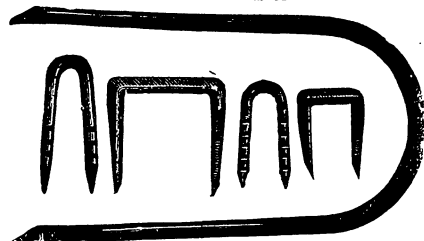
**NOVELTY 5c. SELLERS.****CHAMPION WOOD KEYS.**

**TACKS.** CLAW HANDLES.  
FT. DEARBORN.  
(4 lb. pa.)  
BONNIE BLUE.

**NAILS.** PARISIAN GILT.  
JUST ENOUGH.  
(Brass.)  
DOUBLE ENOUGH.  
(Iron.)

**BRADS. BILL NYE BOX.**

New York Office,  
84 WEST BROADWAY.

**STRUCTURAL TUBING****FOR****Agricultural Implements,****Wagons,****Wheelbarrows,****Fire Escapes,****Blowers,****Wind Mills,****Railway Signals,****Fences,****Hand Railings,****Light Iron Buildings,****Forges,****Brake Beams,****Tops and Masts for Electric Light and Trolley Poles,****Braces for Car Truck Frames, Bedstead Frames,****Railway and Steamship Railings, etc.****NATIONAL STRUCTURAL TUBING CO.,****Potter Building, 38 Park Row, New York.****E. H. Titchener & Co.****BINGHAMTON, N. Y.****—MANUFACTURERS OF—****STAPLES in All Varieties****Double-Pointed Tacks, Bed Links, Etc.**

New York City Agents, **HARMON & DIXON**  
118 Chambers Street.

**Pocket Companion.** Containing useful information and tables appertaining to the use of wrought iron and steel as manufactured by Carnegie, Phipps & Co., Ltd., Pittsburgh, Pa. For engineers, architects and builders, 1892 edition. Edited by C. L. STROBEL, C.E., assisted by F. H. KINDL, C.E. Leather with flap, 334 pages..... \$2.00

For Sale by David Williams, 98-122 Reade St., N.Y.

**ZINC GLAZIERS' POINTS.**

All Sizes Triangles and Sharps. Send for New Illustrated Price Sheet.

**SHELTON CO., - Derby, Conn.****BRASS SHOE NAILS.****PRICES NO HIGHER. PROMPT SHIPMENTS.****CLENDENIN BROS., - BALTIMORE, MD.****TACK AND NAIL Machinery.****BEST AND LARGEST ASSORTMENT.****Wm. A. Sweetser, Brockton, Mass.****IMPROVED**

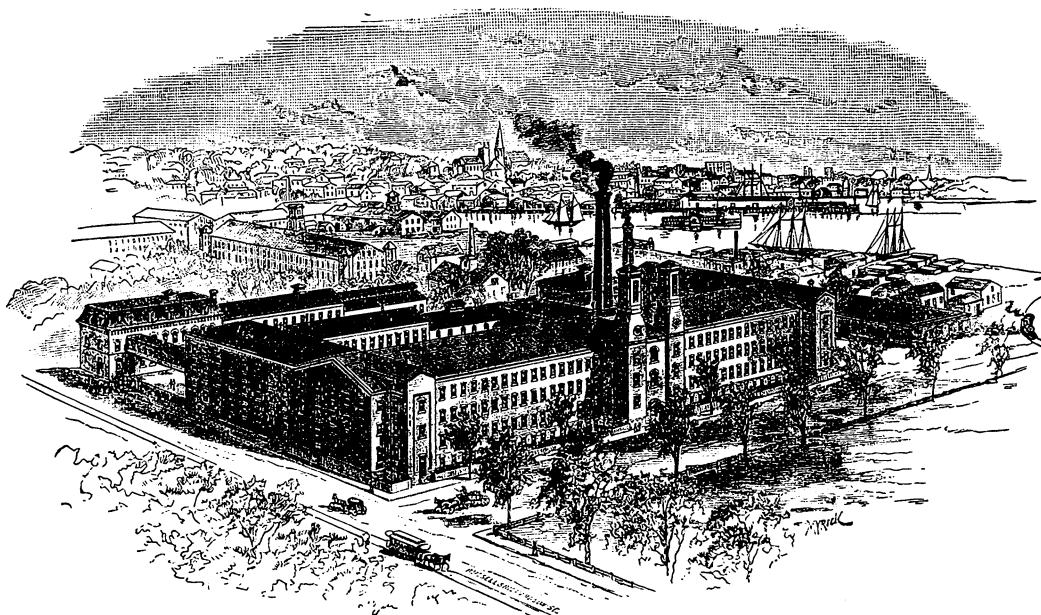
Tack, Shoe and Wire Nail  
**MACHINERY.**

**KIMBAL BROS. & CO., Mfrs.,**  
**BROCKTON, MASS.**

Send for Prices.

# American Screw Company,

PROVIDENCE, R. I.



NEW ENGLAND MILL, PROVIDENCE, RHODE ISLAND, U. S. A.

## MANUFACTURERS OF

### WOOD SCREWS,

In Iron, Brass, Bronze and all Varieties  
of Finish.

### COACH SCREWS,

### MACHINE SCREWS,

### RAILROAD SCREWS,

### HAND RAIL SCREWS,

### SIDE KNOB SCREWS,

### LOCK CAP SCREWS,

### DOWEL SCREWS,

### CHANDELIER SCREWS,

### RIVETS, BURS,

### TIRE BOLTS,

### STOVE BOLTS,

### SLEIGH SHOE BOLTS,

### SINK BOLTS,

### STOVE RODS,

### POINTED WIRES,

### TAPPED NUTS,

### WIRE NAILS,

### DOWEL PINS,

### TAPS FOR MACHINE SCREWS,

### TAPS FOR STOVE BOLTS.

**COLD  
FORGED**

Rogers Drive Screws,  
Side Knob Screws,  
Lock Cap Screws,  
Machine Screws,  
Stove Bolts,  
Forged Wood Screws,  
Threaded Wires,  
Fluted Tire Bolts.

# American Screw Company,

PROVIDENCE, R. I.

Chicago Store. No. 19 Lake St.

EUROPEAN AGENTS, THOMAS & STIRLING, Liverpool.

## Standard Books

—ON—

**FOUNDRY PRACTICE.****The Iron Founder.**

A comprehensive treatise on the art of molding, including chapters on core-making, loam, dry sand and green sand molding, also crystallization, shrinkage and contraction of cast iron and a full explanation of the science of pressures in molds, added to which are formulas for mixtures of iron, tables, rules and miscellaneous information. By SIMPSON BOLLAND. Illustrated with over 300 engravings. 12mo, cloth.... \$2.50

**The Iron Founder Supplement.**

A complete illustrated exposition of the art of casting in iron, comprising the erection and management of cupolas, reverberatory furnaces, blowers, dams, ladles, etc., mixing cast iron, founding of chilled car wheels, malleable iron castings, foundry equipments and appliances, gear molding machines, molding machines, burning, chilling, softening, annealing, pouring and feeding, foundry materials, advanced molding, measurement of castings, wrought iron, steel, etc. Also the founding of statues, the art of taking casts, pattern modeling, useful formulas and tables. By SIMPSON BOLLAND. Illustrated with over 200 engravings; 400 pages; 12mo; cloth..... \$2.50

**The Encyclopedia of Foundry and Dictionary of Foundry Terms,**

used in the practice of molding. Together with a description of the tools, mechanical appliances, materials, and methods employed to produce castings in all the useful metals and their alloys, including brass, bronze, steel, bell, iron and type founding, with many original mixtures of recognized value in the mechanic arts. Also aluminum, plating, gilding, silvering, dipping, lacquering, staining, bronzing, tinning, galvanizing, britannia-ware, German silver, nickel, soldering, brazing, ores, smelting, refining, assaying, etc. By SIMPSON BOLLAND. 12mo; cloth..... \$3.00

**Modern Molding and Pattern Making.**

A practical treatise upon pattern shop and foundry work. By JOSEPH P. MULLIN, M.E.; 257 pages; cloth; illustrated. .... \$2.50

**Iron and Steel Founding.**

Illustrated with 39 diagrams. By C. WYLLIE. Second edition, revised and enlarged; 324 pages; 8vo; cloth..... \$2

**The Practical Brass and Iron Founder's Guide.**

A treatise on brass founding, molding, the metals and their alloys, etc. By JAMES LARKIN, late conductor of the brass foundry department in the Penn Works, Philadelphia. A new revised and greatly enlarged edition. Contents: Among the most important and entirely new sections of this edition of this valuable and popular book are the following: Behavior of Metals and Alloys in Melting and Congealing; Malleable Iron Castings; Wrought Iron or Mite Castings; Manufacture of Steel Castings; Casting of Brass; Casting of Bronze; Bell Founding; Chill Casting; Casting without Core; Casting on to Other Metals; Casting Iron and Other Metals Upon Lace, Emoroid-eries, Fern Leaves and Other Combustible Materials; Some Modern Bronzes. In one volume; 12mo; 400 pages..... \$2.50

**American Foundry Practice.**

Treating of loam, dry sand and green sand molding, and containing a practical treatise upon the management of cupolas and the melting of iron. By THOMAS D. WEST, practical iron molder and foundry foreman. Fully illustrated. Eighth edition, revised. 408 pages; cloth..... \$2.50

**Molder's Text Book,**

being Part II of American Foundry Practice. A practical treatise on molding, discussing the question of economy in casting and the arrangement of a foundry in regard to rapid work. Treating of cupolas, methods of firing, best means of securing perfect and sound castings, &c., being a continuation of Vol. I on this subject, and dealing with a class of work requiring more skill and greater care. By THOMAS D. WEST. With numerous illustrations. Fifth edition. 481 pages; cloth \$2.50

Sent, Postpaid, on receipt of price, by

**DAVID WILLIAMS,**

Bookseller and Publisher.

96-102 Reade St., - New York.

**Gautier Steel Department of Cambria Iron Co.,**

JOHNSTOWN, PA.

—; MANUFACTURERS OF:—

**MERCHANT BAR STEEL:**

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

**AGRICULTURAL STEEL AND SHAPES:**

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

**PLOW STEEL:**

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

**COLD ROLLED STEEL SHAFTING.****STEEL HARROW DISCS.****CAMBRIA LINK BARB WIRE.**

New York Office,  
102 Chambers St.

Philadelphia Office,  
S W. Cor. 5th & Commerce Sts.

Chicago Office,  
209 Phenix Building.

Southern Office,  
Chattanooga, Tenn.

**THE CAMBRIDGE IRON & STEEL CO.**  
MANUFACTURERS OF

**GALVANIZED SHEET IRON**

BLACK SHEETS FOR ROOFING & CORRUGATING

PICKLED & COLD ROLLED FOR STAMPING

CAPACITY RANGES FROM NO. 30  
26 INCHES WIDE TO 4' 4" x 120

CORRESPONDENCE SOLICITED

OFFICE & WORKS CAMBRIDGE, OHIO.

**STOVE PIPE.**

All sizes Plain, Russia and Galvanized Iron. In 24 inch joints assorted diameters, nested and crated for shipment. Cheapest and best in the market.



Plain, Painted or Galvanized Corrugated Sheets.

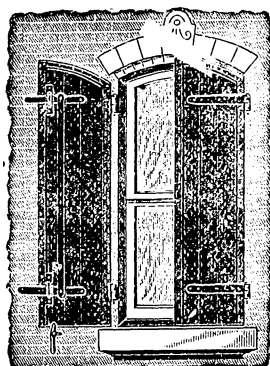
**SIDING, ROOFING, CEILING, &c. &c.**

Galvanized and Plain Steel and Iron Sheets, Bars, Hoop and Band Iron, Nails, Spelter, Lead, Tin, &c. Galvanized Riveted Leader, cheapest and best in the market. Sheet Iron Piping and Fittings of every description.

**GENERAL GALVANIZING TO ORDER.**

**THE JERSEY CITY GALVANIZING CO.,** MANUFACTURERS AND JOBBERS IN  
**Galvanized Material of every description.**

Works, Jersey City. Store, 112 John St., New York.

**PROTECT**

Your Offices, Stores and Warehouses from fire and burglars by using

**Metallic Doors and Shutters**

Made from wood and covered with iron or steel, rendering them stiff and preventing warping in case of fire.  
Made from heavy boiler plate iron.  
Made from double corrugated iron or steel.  
Made to fit any size opening.

Estimates furnished upon application.

**GARRY IRON & STEEL ROOFING CO.,**  
CLEVELAND, OHIO.

Mention The Iron Age.



# Lukens Iron <sup>AND</sup> Steel Co. INCORPORATED 1890.

The First to make Boiler Plates in America.

Chas. Huston, Pres.

A. F. Huston, Vice-Prest.

C. L. Huston, Genl. Mgr.

Robt. B. Haines, Jr., Secy.

Jos. Humpton, Treas.

## STEEL AND IRON PLATES, ALSO SHEETS

TO EXTREME DIMENSIONS.

WIDTHS UP TO 10 FEET.

THICKNESS, No. 12 GAUGE TO 1½ INCHES.

—ESTABLISHED 1810.—

MAIN OFFICE & WORKS:  
Coatesville, Pa.

NEW YORK OFFICE:  
No. 29 Broadway.

PHILADELPHIA OFFICE:  
62 & 64 Bullitt Bldg.

FRANK SAMUEL,  
138-138 So. 4th St.,  
Philadelphia.

# LOW PHOSPHORUS

PIC IRON—.08 or under.  
SCRAP—.08 or .05 or under.  
ORE—For O. H. and Furnace Use.  
MELTING BAR—  
Open Hearth and Bessemer Billets,  
Skelp, Muck Bars and Scrap, Foundry  
and Bessemer Pig Iron.  
Syracuse Tube Co.'s Tubes and Pipe.

**THE PHOENIX IRON CO., 410 Walnut St., Philadelphia,**

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

## WROUGHT IRON AND OPEN HEARTH STEEL.

Beams, Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.  
SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes,  
Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS; JAMES B. STOKES, 182 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

**POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.,**  
PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

# STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

## TESTED CHAINS.

**BRADLEE & CO., - EMPIRE CHAIN WORKS,**

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging,  
Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

## High Grade Tested Chains.

**JAMES McKAY & CO.,**

29TH & LIBERTY STREETS,

PITTSBURGH, PA.

Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

**BARCLAY W. COTTON & CO.,**

Successors to ESHERICK, COTTON & CO.,

Iron and Steel Merchants.

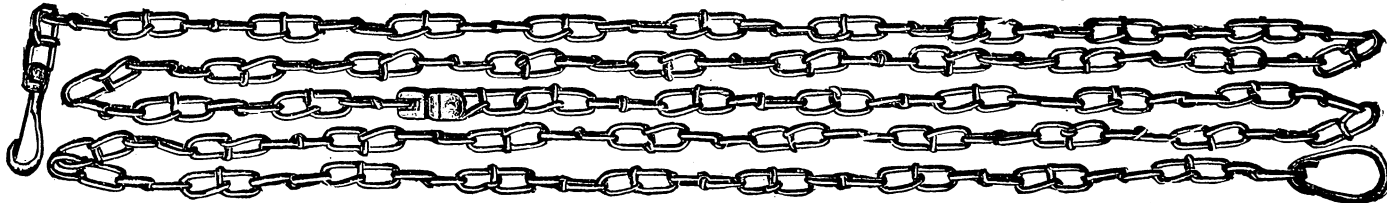
AGENTS FOR

"Continental" Corrugated Furnaces.

418 Walnut St., PHILA.

**LIGHT, STRONG AND SUBSTANTIAL.**

EUREKA WELDLESS TIE OUT OR LARIAT CHAINS for tethering cattle; with swivel every ten feet.



Manufactured by **GARLAND CHAIN CO., Rankin, Pa.**

# EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS

BEAMS, CHANNELS,  
ANGLES, TEES, PLATES,  
RIVETED GIRDERS.

## IRON AND STEEL,

BARS, BANDS, HOOPS,  
BOLTS, NUTS, RIVETS,  
ROOF TRUSSES.

29 BROADWAY,  
**NEW YORK.**

421 CHESTNUT ST.,  
**PHILADELPHIA.**

70 KILBY ST.,  
**BOSTON.**

OUR OFFICES AND MILLS ARE CONNECTED BY TELEPHONES.

**EDWARD J. ETTING,**  
**IRON BROKER & COMMISSION MERCHANT**  
 222 S. THIRD ST., PHILADELPHIA, PA  
 Pig, Bar and Railroad Iron, Old Rails, Scrap  
 AGENT FOR THE  
**MOUNT SAVAGE FIRE BRICK**  
 Eastern Penna., West New Jersey and Delaware.  
**Agent TRENTON IRON CO.**  
 For the Sale of Wire and Wire Rope.  
 Longdale (Va.) and other Pig Irons.  
 STORAGE YARD, Pier No. 57 South (old Navy Yard),  
 which is connected with Penn. R. R. and its various  
 connections. Negotiable Warehouse Receipts Issued,  
 CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.  
**JEROME KEELEY & CO.**  
 The Philadelphia Bank Bldg., 421 Chestnut St.,  
 PHILADELPHIA.  
**Foundry & Forge Pig Irons,**  
**Iron Ores, Coke, Coal,**  
**Steel Blooms, Billets, Rails, etc.**  
**Muck Bars, Blooms, Scrap Iron.**  
 Consulting Engineers in Metallurgy and Mining.

**JUSTICE COX, JR.,**  
 218 South 4th St., Phila., Pa.  
**IRON and STEEL.**  
 — AGENT FOR —

Haldeman, Grubb & Co's.  
 Chickies Bessemer Pig Iron.  
 Mahoning Rolling Mill Co's  
 Best Quality Skelp Iron and Steel.  
 Pulaski Iron Co's  
 High Grade Foundry and Forge Pig Iron.  
 Hainsworth Steel Co's  
 Standard Bessemer Steel Billets.  
 Bars, Angles, Sheets, Tank and Bridge  
 Plates, Muck Bars, Blooms, Scrap Iron  
 and Tool Steel.

**J. W. HOFFMAN & CO.,**  
 Bullitt Building, 135 So. 4th St., Philad'a,  
**Iron and Steel Merchants.**  
**PIG IRON,**  
 Iron and Steel Plates, Sheets, Bars and Shapes. Rails  
 Cars and Locomotives. Track Equipment.  
 CORRESPONDENCE SOLICITED.

**JOHN L. HOGAN & CO.,**  
**IRON COMMISSION MERCHANTS,**  
 Bullitt Building, 135 South Fourth St., Phila.  
**Agents for Brier Hill, Lehigh, Struthers**  
**AND MUIRKIRK PIG IRON,**  
 Delaware Rolling Mill, muck bars, Youngstown Steel  
 Co., Connellsville Coke.

**W. H. THOMSON & CO.,**  
 DEALERS IN  
**IRON AND STEEL,**  
 COAL AND COKE,  
 STEAMSHIP OUTFITS,  
 RAILWAY EQUIPMENT.  
 ROOM 373 BULLITT BUILDING,  
 PHILADELPHIA, PA.

C. B. Houston. J. Max Bernard. H. H. Houston.  
**C. B. HOUSTON & CO.,**  
 Bullitt Building, PHILADELPHIA.  
 Pig Iron, Coal, Coke, Steel Rails, Structural  
 Iron, Steel Castings and Fire Brick.  
 Sole Agents for Paxton Rolling Mills.  
**STEEL AND IRON PLATES.**

**FRANCIS WISTER**  
**COMMISSION MERCHANT,**  
**Coke, Coal, Ores.**  
 PEA AND BUCKWHEAT (Red and White Ash).  
 National Foundry Coke a Specialty. Sulphur less  
 than 0.5.  
 All Sizes National Crushed Coke.  
 420 Walnut Street, PHILADELPHIA.

W. S. PILLING.

T. L. CRANE

## PILLING—AND—CRANE.

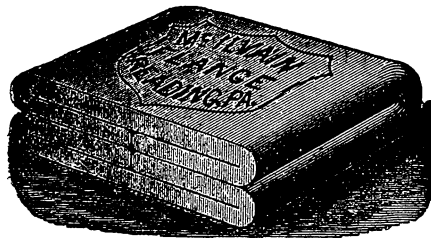
**IRON ORES:** Lake Superior, Foreign, Concentrates,  
 Magnetic and native Self-fluxing.  
**PIG IRON:** Low Phosphorus, Open-hearth, Bessemer  
 and other grades.  
**STEEL:** In Blooms, Slabs and Billets, and scrap.  
**COKE:** For Furnace and Foundry use.  
 BULLITT BUILDING, 141 S. FOURTH ST., PHILADELPHIA.

**ALAN WOOD COMPANY,**  
 MANUFACTURERS OF  
 Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,  
**PLATE & SHEET IRON.**  
 ALSO LIGHT PLATES AND SHEETS OF STEEL,  
 No. 519 Arch Street, Philadelphia, Pa.  
 Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack,  
 Tank and Boat Iron; Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

**J. J. MOHR,**  
 Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.  
 —SOLE AGENT FOR—  
 Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-  
 DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.  
 Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

**JAMES G. LINDSAY & CO.**  
 BULLITT BUILDING, 133 South Fourth St., PHILA.  
**IRON and STEEL STRUCTURAL MATERIAL**  
 For all purposes. Estimates Furnished for Iron and Steel Structures.

TENSILE } 56,000 to 64,000 lbs.  
 STRAIN. }



**WM. McILVAIN & SONS,**  
 READING, PA.,  
 MANUFACTURERS OF  
**IRON AND STEEL**  
**BOILER PLATES.**

Locomotive, Fire Box, Flange, Shell,  
 Tank Iron and Steel, including Plates for  
 Bridges, Girders, Stacks, Pipe and Fire  
 and Burglar-proof Safes.  
 CAPACITY. { Plates 1 inch thick to No. 12.  
 { 30 feet long.  
 { 70 inches wide.

**EDITION FOR 1894.**  
**DIRECTORY**  
 — OF THE —  
**Iron and Steel Works**  
**OF THE UNITED STATES.**

Embracing a complete list of the Blast Furnaces, Rolling  
 Mills, Steel Works, Forges and Bloomeries in every State and  
 Territory; also Wire Mills, Wire Nail Works, Car Axle Works,  
 Car Wheel Works, Car Builders, Locomotive Works and Cast  
 Iron Pipe Works and Wrought Iron Pipe Works, Tin Plate  
 Works, Rod Mills, Cut Nail Works, Shipbuilding and Bridge-  
 building Works. 304 pages, cloth.

Published by The American Iron and Steel Association.

**PRICE, - - - \$5.00.**

Sent on receipt of price by

**DAVID WILLIAMS,** - Publisher and Bookseller,  
 96-102 Reade Street, NEW YORK.

# FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,  
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" **(XX)** Extra Best and "Warranted Best"  
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "**NELSON**" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.  
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

## THOS. FIRTH & SONS, LIMITED, SHEFFIELD.

CRUCIBLE CAST STEEL.

ABBOTT, WHELOCK & CO., Agents and Importers of  
**SWEDISH IRON,**

35 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

## S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel,

in Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand "**TOUGH**" Cast Steel for Leather Splitting and Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St., New York.

Frank S. Pilditch, Agent.

CARLISLE **KAYSER, ELLISON & CO.,** SHEFFIELD, ENGLAND  
WORKS, Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

### CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

31 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

## JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Corset Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

## JESSOP'S STEEL

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

OF **Best Quality,**  
IN **Bars, Sheets AND Plates.**

Large assortment of sizes in stock at

91 John St., - - - - - NEW YORK.

And other Agencies.

SHEFFIELD,  
ENGLAND.

Gold Medal Paris,  
1889.

## "F.W. MOSS" SHEFFIELD STEEL & FILES

For further particulars apply to

NEWTON &

SHIPMAN.

33 John St., New York.

Prices for Direct Importation in Wholesale Quantities From Sheffield.

Improved Mild Centered Cast Steel for Taps, Reamers, &c.....	@ 55	Per ton in Sheffield.
Warranted Extra Cast Steel for Taps, Dies, Milling Tools, &c.....	" 50	" " "
Warranted Cast Steel for tools, Taps, Dies, Turning Tools, &c.....	" 44. 10/	" " "
Best Crucible Machinery Steel.....	" 30	" " "
Best C. S. EXTRA WEIGHT HAND CUT FILES.....	@ 50% & 4% cash discount	" " "

No charge for extra sizes when steel is ordered in wholesale quantities of assorted sizes.

Stay-Bolt,  
Rivet, D. Link,  
Axe, Hatchet,  
Carriage and  
Wagon Axle

**IRON.**

Superior Quality Refined Bar Iron  
"VULCAN" AND "LOCKHART" BRANDS.



SMALL CHANNELS AND ANGLES,

HEXAGON IRON AND STEEL.

All  
Merchant Bar  
Sizes  
of  
Soft  
**STEEL.**

WHEELER.

G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third St., Philadelphia, Pa.

—DEALERS IN—

**IRON AND STEEL SCRAP.**

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.  
Steel and Iron Plates, New and Old Rails.

# C A M B R I A S T E E L ,

**Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings,**  
**BESSEMER AND OPEN HEARTH BLOOMS, BILLETS AND BARS.**  
**Steel Axles, Steel Angles, Steel Channels, Steel Forgings**  
**C A M B R I A I R O N C O M P A N Y ,** Office, 218 S. Fourth St., Philadelphia.  
 Chicago Office, Phoenix Building.  
 (WORKS AT JOHNSTOWN, PA.)  
 New York Office for Rails and Fastenings, 33 Wall Street.

Manufacturers of  
 Iron and Open-Hearth  
 Steel Bars and Structural Shapes, Car and Engine Axles. . . .

## Pencoyd Iron Works.

Works, Pencoyd, Pa.  
 Office, 261 S. 4th St., Phila., Pa.

## A. & P. Roberts & Co.

Designers and Builders of  
 Bridges, Viaducts,  
 Train-Sheds, Elevated  
 Railroads and All Iron  
 and Steel Structures. .

E. H. Wilson. A. Kaiser. J. B. M. Hiron.  
**E. H. WILSON & CO.,**  
 222 and 224 South Third St., Philadelphia  
 BROKERS AND DEALERS IN  
**IRON AND STEEL.**  
 Correspondence solicited.

**PIERSON & CO.,**  
 —DEALERS IN—  
**IRON and STEEL**  
 OF EVERY DESCRIPTION,  
 29 Broadway, cor. Morris St.,  
 NEW YORK.

## A. R. WHITNEY & CO.,

MANUFACTURERS AND DEALERS IN

## IRON and STEEL.

AGENCIES:  
 CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.  
 PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.  
 BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.  
 RIVERSIDE IRON WORKS, Steel Pipe.  
 GLASGOW TUBE WORKS, Boiler Flues.  
 AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States, 25 in Europe and 100 in Canada.  
 THE SEIDELL & HASTINGS CO., Charcoal Iron Boiler Plates.  
 Plans and estimates furnished and contracts made for Iron and Steel Structures of every description. Please address  
 29 Broadway, New York.  
 P. O. Box 33.

**NORTH BROTHERS MFG. CO.,**  
**Iron and Brass Founders,**  
 HAVE REMOVED  
 their Foundry Department from 3d and Race Sts., and consolidated same with their manufacturing plant at  
 N. E. cor. Lehigh Ave. & American St.,  
 PHILADELPHIA, PA.,  
 Where New Foundry Buildings have been erected.

**AMERICAN**  
**PIC IRON STORAGE WARRANT CO.,**  
 (Bank of America Building.) 44 Wall St., N. Y.  
 Correspondence of Furnaces Invited.



Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.  
**CHROME STEEL WORKS,**  
 Brooklyn, N. Y.

**A. MILNE & CO.,**  
**Swedish (Norway) Iron and Steel,**  
 BLOOMS, BILLETS, BARS; WIRE, RIVET AND NAIL RODS.  
**FOREIGN AND DOMESTIC IRON AND STEEL.**  
 1 Broadway, New York. 8 Oliver Street, Boston.

**GUSTAF LUNDBERG,**  
 Agent for **N. M. HÖGLUND'S SONS & CO.** of Stockholm.  
**SWEDISH AND NORWAY IRON.**  
 Bessemer and Open Hearth Steel.  
 19 KILBY ST., BOSTON.

**POTTSTOWN IRON CO.**  
**POTTSTOWN, PA. U.S.A.**

**FRANKFORD STEEL COMPANY**  
 FRANKFORD, PHILA., PA.  
**Steel Railroad and Machine Forgings,**  
 SOLID CRUCIBLE STEEL CASTINGS  
 AND  
 Best Grades of Tool and Machinery Steel.

**ÆTNA-STANDARD IRON & STEEL CO.,**  
MANUFACTURERS OF  
**BLACK SHEETS, GALVANIZED, CORRUGATED, TIN AND TERNE PLATES,**  
 Sheets Suitable for All Purposes, Cold Rolled or Common, Patent Leveled and Other Specialties, Roofing and Building Supplies.  
**BARS, LIGHT STRUCTURAL SHAPES AND RAILS.**  
 Bars, all sizes and qualities, Angles, Tees, Channels, Steel Tire and Toe Calk. Special Sizes and Shapes Made to Order.  
 WRITE FOR CATALOGUE AND PRICES. *Large Stocks Carried to Facilitate Prompt Shipment.* **BRIDGEPORT, OHIO.**

## CARBON STEEL COMPANY, PITTSBURGH, PA.

MANUFACTURERS OF

Universal Mill Plates.  
 Sheared Plates and  
 Sheets.



Boiler, Ship and Armor  
 Plates.  
 Also Nickel Steel Plates.

**LIST OF SIZES SENT UPON APPLICATION.**

Eastern Office, Havemeyer Building, New York. Western Office, Western Union Building, Chicago.

**AGENCIES:**

L. S. BOOMER, 647 The Rookery, Chicago, Ill.

THE CONDIT-FULLER CO., Perry-Payne Building, Cleveland, O.

GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.

JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.

**- R. MUSHET'S -**  
**"SPECIAL," STEEL "TITANIC,"**  
 FOR  
 LATHE AND PLANER TOOLS. For Chisels, Taps, Dies, Chilled Roll  
 (The "Trade-Marks" of which are registered in the United States.) Turning, Punches, &c., &c.  
MANUFACTURED ONLY BY  
**SAMUEL OSBORN & CO.,** Clyde Steel & Iron Works, Sheffield, Eng.  
SOLE REPRESENTATIVES IN THE UNITED STATES,  
**B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.**  
**No. 143 LIBERTY STREET, NEW YORK.**

## FLINT & CO.,

68 Broad St., New York,

**EXPORTERS**

-OF-

Rolling Stock, Rails and Railway Supplies  
 of all kinds, Bar and Sheet Iron and  
 Steel, Cast and Wrought Iron  
 Pipe, Boiler Plates, Barb  
 Wire, and all sorts of  
 Steel and Iron Man-  
 ufactures to

**SOUTH AMERICA and WEST INDIES.**

**AGENCIES:**

Quayle, Davidson & Co.	- - -	Rio de Janeiro.
Luis de Olazarra.	- - -	Havana.
Winfield S. Stern.	- - -	Valparaiso.
F. L. Crosby.	- - -	Lima.
E. Pavia.	- - -	Guayaquil.

Correspondence solicited from Manu-  
 facturers interested in export.

## RIVERSIDE IRON WORKS,

Manufacturers of

**"RIVERSIDE"**  
**Steel Nails.**

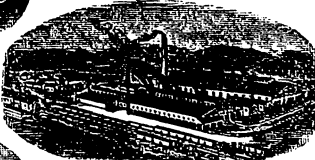
Bessemer, Forge and  
 Foundry Pig Iron.



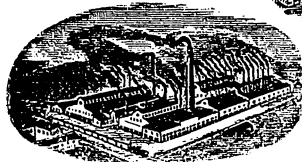
RIVERSIDE FURNACE, BESSEMER  
 STEEL PLATE MILL AND TUBE DE-  
 PARTMENTS AT BENWOOD, W. VA.

**"RIVERSIDE"**  
**Steel Pipe.**

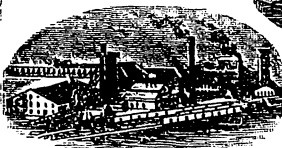
Steel Billets, Blooms, Bar  
 Steel, T and Flat Rails.



NAIL FACTORIES AND WAREHOUSE AT  
 WHEELING, W. VA.



BAR MILLS, FORGE AND COAL MINES AT  
 WHEELING, W. VA.



FURNACE AND COAL SHAFT AT STEUBENVILLE

**WHEELING, . . . W. VA.**

REPRESENTATIVES: CHAS. S. STEPHENS, No. 21 Beekman St., New York; E. R. MANN & CO., No. 147 So. 4th St., Philadelphia, Pa.; CASEY & DAY, No. 446 Rookery, Chicago, Ill.; THE HAZEN CO., No. 59 W. 4th St., Cincinnati, O.



**PASSAIC ROLLING MILL CO., Paterson, N. J.**

MANUFACTURE

## ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Ferriplugs, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.

## The Practical Brass and Iron Founder's Guide.

A Treatise on Brass Founding, Molding,  
 the Metals and their Alloys, etc.

By JAMES LARKIN,

Late Conductor of the Brass Foundry Department of  
 the Penn Works, Philadelphia.

A New Revised and Greatly Enlarged Edition.

**CONTENTS:**

Among the most important and entirely new sections  
 of this edition of this valuable and popular  
 book are the following:

Behavior of Metals and Alloys in Melt-  
 ing and Congealing; Malleable Iron Cast-  
 ings; Wrought Iron or Mitis Castings;  
 Manufacture of Steel Castings; Casting of  
 Brass; Casting of Bronze; Bell Founding;  
 Chill Casting; Casting without Core;  
 Casting on to other Metals; Casting Iron  
 and other Metals upon Lace, Embroideries,  
 Fern Leaves and other Combustible Ma-  
 terials; Some Modern Bronzes.

In one volume, 12mo, 400 pages, \$2.50.

Sent, postpaid, on receipt of price, by

**DAVID WILLIAMS,**

Bookseller and Publisher,

96 - 102 Reade Street, - New York.

ESTABLISHED IN 1848.

**SINGER, NIMICK & CO., Ltd.**

PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

Hammered and Rolled

**STEEL.**

Warranted Equal to any Produced.

**HIGH GRADE SPECIAL Crucible Tool Cast Steel**, for all purposes requiring the **very finest** quality.**SINGER'S ANNEALED EXTRA Crucible Tool Cast Steel**, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an **extra fine** quality.**BEST Crucible Tool Cast Steel**, for all purposes requiring steel of **Standard** quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.**SAW STEEL**, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.**HOT ROLLED SHEET STEEL**, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.**BRIGHT COLD ROLLED SHEET and STRIP STEEL**, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequaled finish and accuracy of gauge,**ROUND MACHINERY STEEL**, for Shafting, Rollers, Spindles, &c., &c.**AGRICULTURAL STEEL.**

"Iron Centre" Cast Plow Steel.  
 "Soft Steel Centre" Cast Plow Steel.  
 "Soft Steel Back" Cast Plow Steel.  
 "Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.  
 Crucible Cast Plow Steel.  
 Steel Rotary Harrow Discs.  
 Finished Rolling Plow Colters.  
 Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at **243 Pearl and 18 Cliff Streets, NEW YORK**, by**HOGAN & SON, General Agents for Eastern and New England States.**

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA &amp; CO., 110 North St., Boston, and

W. E. STOCKTON, 16 &amp; 18 West Lake St., Chicago.

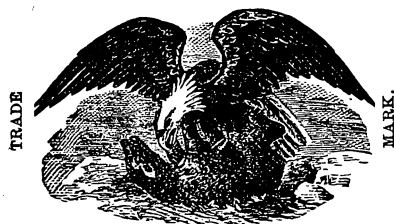
HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

**LA BELLE STEEL CO.,**

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa.

**MANUFACTURERS OF ALL KINDS OF STEEL SPRINGS, AXLES, RAKE TEETH, Etc.****WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston, and 93 Liberty St. N.Y.**

Canadian Agent, W. C. BLYTH, No. 76 York St., Toronto, Ont.

**W. Dewees Wood Co.,**

MANUFACTURERS OF PATENT

**PLANISHED SHEET IRON.**

PATENTS:

Dec. 10th, 1878.	Mar. 4th, 1884.	Aug. 31st, 1886
Jan. 10th, 1882.	April 15th, 1884.	Jan. 1st, 1889.
Jan. 1st, 1884.	June 10th, 1884.	Jan. 17th, 1893
Feb. 12th, 1884.	Jan. 6th, 1885.	

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS:

**McKEESPORT, PA.**

Branch Office: 111 Water Street, Pittsburgh, Pa.

**J. TATNALL LEA & CO.,**

No. 125 So. 4th St., PHILADELPHIA.

Bessemer, Mill and Foundry  
 Pig Iron, Steel Billets,  
 Muck Bars and Iron Ores.

— SOHO IRON & STEEL WORKS —

**MOORHEAD & McCLEANE CO.**  
 MANUFACTURERS OF

**PLATE IRON & STEEL.**  
**GALVANIZED SHEET IRON**  
**PLATES SPECIAL WIDE SHEETS AND EXTRA LONG SKELP IRONS**  
**PITTSBURGH.**

TRADE MARK  
 CHB  
 CORRUGATED & ROOFING IRONS  
 CURVED CORRUGATED IRONS

OFFICES AND WORKS.

EASTERN WAREHOUSE. WESTERN WAREHOUSE.  
 No. 81 JOHN STREET, Nos. 16 & 18 W. LAKE ST.  
 NEW YORK. CHICAGO.

—ESTABLISHED 1850.—

**ARCADE MALLEABLE IRON CO.****WARREN McFARLAND & CO.****Malleable Iron and Steel Castings,****WORCESTER, MASS.**

Correspondence solicited. Prices given upon receipt of patterns or samples.

**GEO. B. BUCKINGHAM,****THE ALLENTOWN ROLLING MILLS,**

MANUFACTURERS OF

Pig Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Fish Plates, Bolts, Nuts and Spikes.

Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Machinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders of all classes of Machinery. Makers of Castings of all descriptions for Cable and Electric Railway.

ALLENTOWN, PA.





**BIRMINGHAM IRON FOUNDRY,**

BIRMINGHAM, CONN.

**CHILLED ROLLS AND ROLLING  
MILL MACHINERY,  
McCoy Patent Mill Pinions,  
Shears, Rotary Squeezers,  
WIRE DRAWING MACHINERY**

Special Rolling Machines for Gun Bar-  
rels, Hoes, Pick and Axe Polls, Odd  
Shapes and Tapers.

ESTABLISHED

1836.

**POWDER**

—FOR—

Blasting, Mining and Sporting.  
**ORANGE BRAND.  
ELECTRIC BLASTING APPARATUS  
SAFETY FUSE, &c.**

Send postal card for Illustrated Pamphlet,  
showing sizes grains Powder, and describing  
Blasting Apparatus. Mailed **FREE**.

**LAFLIN & RAND POWDER CO.,**

New York Office, 29 Murray St.

**DYNAMITE,****RED STAR BRAND,**

For Mining, Quarrying and Stump Blasting.

Safety Fuse, Caps, Platinum Fuse, Leading  
and Connecting Wire, with every other requi-  
site for Blasting Purposes. The especial atten-  
tion of the hardware trade is invited to our  
line of goods.

**NEW YORK POWDER CO.,**

62 Liberty St., New York.

**Patent Tumbling Barrels.****MANY VARIETIES****For all Kinds of Work.**

Send for new Catalogue.

**HENDERSON BROS., WATERBURY, CONN.**

**S. CHENEY & SON;  
GRAY IRON CASTINGS,  
CHEAP HEATING STOVES,  
DIAMOND THIMBLES**

**MANLIUS, N. Y.****DONALDSON IRON COMPANY.**

MANUFACTURERS OF



**CAST IRON PIPE,**  
And Spec'al Castings for Water and Gas. Also Flange Pipe.  
**EMAUS, LEHIGH CO., PA.**

**FINE GRAY IRON****FRANKLIN IRON FOUNDRY,****The Burr and Houston Company**

33-39 Franklin Street, Brooklyn (Green-  
point), N. Y.

Special Attention Given to Fine Castings.  
Telephone Call, Greenpoint 174

**CHESS BROTHERS,**

MANUFACTURERS OF A FULL LINE OF

**SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.**

Always in stock. Special goods made to order.

**SOFT STEEL PLATES.**

Suitable for Implement manufacture and for all Blanking or Stamping uses,  
of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive; in  
widths up to 15½ inches and to multiples of lengths desired. Finished black or  
scaled. And

**EXPANDED METAL**

In all its varieties of

**Fire-Proof Lath, Fencing, Tree Guards, &c.**

Send for catalogues and prices.

**Office, 531 Wood St., PITTSBURGH, PA.**

J.S. SEAMAN.  
ROBT. SLEETH  
GEO. BLACK

PHOENIX ROLLWORKS  
SEAMAN, SLEETH & BLACK  
OFFICE & WORKS  
41ST & 42ND ST & A.V.R.R.  
ESTABLISHED 1870

ROLLS AND PINIONS  
EXCLUSIVELY  
FOR ALL PURPOSES.

ROLLS. EST'D. AND 1863. PINIONS.

THE TOTTEN & HOGG  
IRON & STEEL  
FOUNDRY CO.  
OFFICE & WORKS  
24TH ST & A.V.R.R.  
PITTSBURGH, PA.

SHEARS SQUEEZERS AND ROLLING MILL MACHINERY

CHILLED & SAND ROLLS & ROCK CRUSHERS.

GEORGE MESTA, Prest.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

**LEECHBURG FOUNDRY & MACHINE CO.,**

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes  
**ROLLS.** MESTA'S PATENT PICKLING MACHINES AND TIN  
PLATE MACHINERY.

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.

RAIL.  
BEAM.  
BAR.

**ROLLS**

STRUCTURAL.  
SPECIALS.  
SHAPES.

**EAST CHICAGO FOUNDRY COMPANY,**

Office, 716 "The Rookery,"

CHICAGO.

**DROP FORGING.**

ESTIMATES GIVEN ON APPLICATION.

Sole Manufacturers of Ahlstrom's Patent Parallel Double

**EXPANSION BOLTS,**

also Single Expansion Bolts. Catalogues mailed on Application.

**W. C. BOONE MFG. CO.**

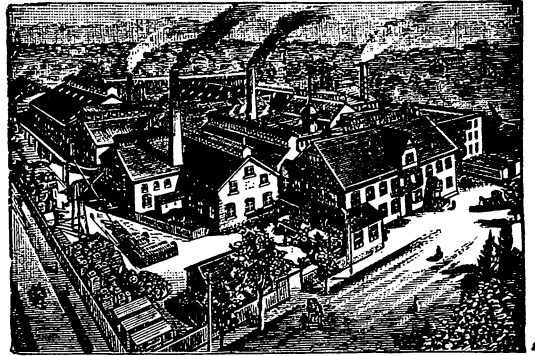
Office and Factory,

**BOONTON, N. J.**

# Sessions Foundry Co., BRISTOL, CONN. IRON CASTINGS TO ORDER.

We make small and large castings of all descriptions, of best quality, and at very low prices.

**CORRESPONDENCE SOLICITED.**



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing. **CLEVELAND, O.**

## STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,  
Of Open Hearth, Chester or Bessemer Steel.  
*True to Pattern. Sound. Solid.*

Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.  
*Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.*

Steel Castings of Every Description.

**Chester Steel Castings Co.**  
Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

**I. S. SPENCER'S SONS, Guilford, Conn.,**

— MAKE TO ORDER —

**FINE GRAY IRON CASTINGS** OF BEST MATERIAL AND WORKMANSHIP.

Sound and Smooth **BRASS** and **BRONZE** CASTINGS and **HARDWARE.**

We have Machine Shop and Electro Plating Facilities.

SAMPLES SOLICITED FOR ESTIMATES

# FOUNDRY FACINGS

sold under the name of "Radiant" are known all over the world as the best and are used by progressive foundries who want to turn out good clean castings.

If you don't use it and wish to try some send for free sample.

**THE J. D. SMITH FOUNDRY SUPPLY CO., - CINCINNATI, O.**

**STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO.**

— HEADQUARTERS FOR —

**LIGHT GRAY IRON CASTINGS,**

— UNEQUALED IN —

**SOFTNESS and SUPERIOR FINISH.**

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can please you. Send samples for prices.

**SHICKLE, HARRISON & HOWARD IRON CO.**

FOUNDERS OF

**OPEN HEARTH  
STEEL CASTINGS,**

FROM 15 LBS. TO 15 TONS IN WEIGHT.

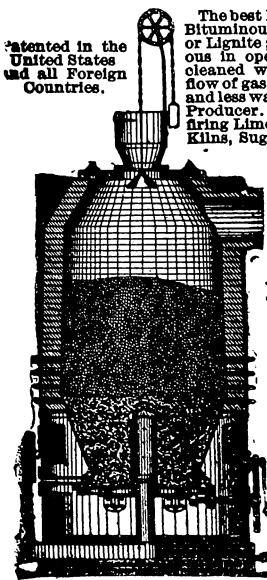
**ST. LOUIS.**

**R. D. Wood & Co.** 400 Chestnut St.,  
PHILADELPHIA.

SOLE MAKERS OF THE

**TAYLOR REVOLVING-BOTTOM  
GAS PRODUCER.**

Patented in the United States and all Foreign Countries. The best Producer for either Bituminous or Anthracite coal or Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for firing Lime, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.



Also applicable to all Regenerative Furnaces. Send for Pamphlet.

**CAST IRON  
PIPE**

**MATHEWS'  
FIRE HYDRANTS  
EDDY VALVES,  
VALVE  
INDICATOR POSTS.**

Heavy Loam Castings  
Special Machinery.

Water Power Pumps  
and  
**TURBINES.**

**HYDRAULIC JIB and TRAVELING CRANES,  
FREIGHT and CAR LIFTS, Etc.  
GAS HOLDERS and GAS MACHINERY.**

## THE IRON-FOUNDER

A COMPREHENSIVE TREATISE ON

**THE ART OF MOLDING,**

INCLUDING CHAPTERS ON

CORE-MAKING; LOAM, DRY-SAND, AND GREEN SAND MOLDING; ALSO CRYSTALLIZATION, SHRINKAGE, AND CONTRACTION OF CAST IRON, AND A FULL EXPLANATION OF THE SCIENCE OF PRESSURES IN MOLDS; ADDED TO WHICH ARE FORMULAS FOR MIXTURES OF IRON, TABLES, RULES AND MISCELLANEOUS INFORMATION.

BY

**SIMPSON BOLLAND,**

*Practical Molder and Manager of Foundries.*

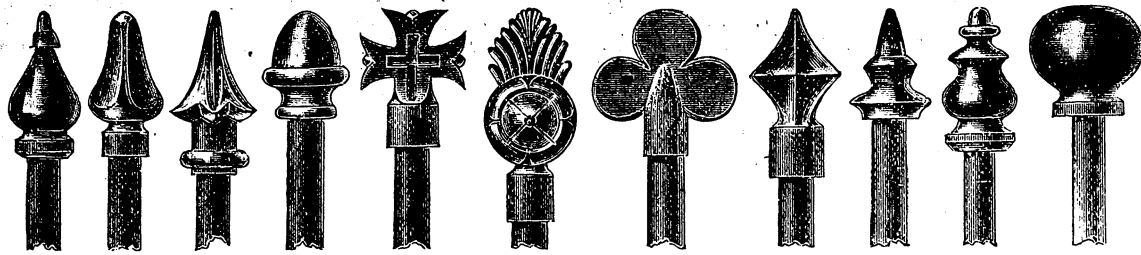
Illustrated with over Three Hundred Engravings.

12mo, Cloth, \$2.50.

Will be sent free on receipt of the price.

**DAVID WILLIAMS, Publisher & Bookseller**

96-102 Reade St., New York.



**Fence  
Tops.**

**TORRANCE  
IRON CO.,  
TROY, N. Y.**

## BOOKS

—ON—

### Mechanical and Steam Engineering.

#### Engineers' Sketch Book.

By THOMAS WALTER BARBER, engineer.  
Nearly 2000 illustrations, descriptive notes  
and memoranda; 243 pages; cloth..... \$3

#### Locomotive Engine Running and Management.

A practical treatise on the locomotive engines, showing their performance in running different kinds of trains with economy and dispatch; also directions regarding the care, management and repairs of locomotives and all their connections. Illustrated by numerous engravings. Seventeenth edition. By ANGUS SINCLAIR, M.E. Cloth.....\$2

#### Stationary Steam Engines.

Especially adapted to electric lighting purposes. Treating of the development of steam engines—the principles of construction and economy, with description of moderate speed and high speed engines. By Prof. R. H. THURSTON. Fourth edition; 177 pages cloth..... \$1.50

#### Complete Practical Machinist.

By JOSHUA ROSE. Embracing lathe work, vise work, drills and drilling, taps and dies, hardening and tempering, the making and use of tools, &c. Fifteenth edition; 356 illustrations; 430 pages.....\$2.50

#### Modern Steam Engines.

An elementary treatise upon the steam engine, written in plain language, for use in the workshop, as well as in the drawing office, giving full explanations of the construction of modern steam engines, including diagrams, showing their actual operation; together with complete but simple explanations of the operations of various kinds of valves, valve motions and link motions, &c., thereby enabling the ordinary engineer to clearly understand the principles involved in their construction and use, and to plot out their movements upon the drawing board. By JOSHUA ROSE, M.E. Illustrated by 422 engravings; 321 pages, 10 x 12 inches; cloth.....\$6

#### The American Steam Engineer.

Theoretical and practical, with examples of the latest and most approved American practice in the design and construction of steam engines and boilers of every description. For the use of engineers, machinists, boiler makers and students. By EMORY EDWARDS, M.E. Illustrated by 77 engravings; 419 pages; cloth.....\$2.50

*Sent, post-paid, on receipt of price by*

**DAVID WILLIAMS,**

Publisher and Bookseller,

96-102 READE ST., - NEW YORK

# IRON CASTINGS.

**WILCOX, CRITTENDEN & CO.,  
MIDDLETOWN, CONN.**

## ESTIMATES HEAVY MACHINERY AND CASTINGS.

GIVEN ON ALL  
KINDS OF

THE BEST EQUIPPED FOUNDRY AND MACHINE SHOP IN AMERICA FOR HEAVY WORK.

**THE WALKER MFG. CO.,  
CLEVELAND, OHIO.**

## THE GARTLAND FOUNDRY CO.,

MANUFACTURERS OF

Light Work our Specialty. **Soft Grey Iron Castings.** We are prepared to do Japanning and Galvanizing.  
UNION and ECHO STS., CLEVELAND, O.  
Cleveland, Canton & Southern R. R.,

## Castings.

**| BRASS, COPPER, COMPOSITION AND GRAY IRON. |**

Small and Medium, of Fine Quality and at Low Prices.

**THE R. E. PARSONS CO.,**

Correspondence  
Solicited.

**BRIDGEPORT, CONN.**

**GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS**  
of the very best quality.

Very much time saved by using clean and soft castings. We use only the best material. A trial will convince you. PICKETS and ROSETTES for Wire Workers. Catalogue of same. NICKEL PLATING and JAPANNING, also METAL PATTERN MAKING and LIGHT MACHINE WORK. We invite correspondence.

**HAIGHT & CLARK, - - ALBANY, N. Y.**

# Double Headed Rotary Shears.

**TRETHERWEY MFG. CO., - 47th ST., PITTSBURGH, PA.,**

MANUFACTURERS OF

Shear Grinding Machinery, Circle Cutting Machines, Roll Lathes, Hardened Forged Steel Rolls, Roll Turning Tools, Solid Steel Shear Knives, Tool Steel Dies of any size, Forgings of Machinery or Tool Steel, Rolling Mill Machinery, Steam Hammers, Squaring Shears.

## THE S. R. SMYTHE COMPANY.

LEWIS BLOCK, ENGINEERS AND CONTRACTORS, PITTSBURGH, PA.

### Regenerative Gas Furnaces and Gas Producers For All Purposes.

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc.,

We contract for complete Plants, guarantee results and operation. OVER 100 PLANTS BUILT AND WORKING.

McAULEY FEED WATER HEATER AND PURIFIER. Clean Boilers Guaranteed at small cost. No scale, better service, and saving in fuel.

## Wm. Swindell & Bros.

548 Smithfield Street, - Pittsburgh, Pa.

CONSULTING AND CONTRACTING ENGINEERS.

Regenerative Gas Furnaces for all purposes. Duff's Patent Water Seal Gas Producers, Swindell's Improved Gas Producers, 329 built in three years. Patent Annealing and Enameling Furnaces.

Plans and Specifications furnished at a reasonable cost for all kinds of furnace work.

## ELECTRICAL BOOKS.

**The Phonograph and How to Construct It.** With a chapter on sound. By W. GILBERT. Deals with the construction of the phonograph in such a plain manner that the student will clearly understand its construction. A complete set of drawings to scale of the various parts of the phonograph accompany the book. 87 pages, illustrated, 12mo, cloth .....\$2.00

**Standard Tables for Electric Wiremen,** with Instructions for Wiremen and Linemen. Rules for Safe Wiring, Diagrams of Circuits and Useful Formulae and Data. By CHARLES M. DAVIS. Third edition, thoroughly revised and edited by W. D. Weaver. Illustrated, 18mo, mor. ....\$1.00

**Practical Electric Light Fitting.** By F. C. ALLSOP. A treatise on the wiring and fitting-up of buildings deriving current from central station mains and the laying down of private installations. 290 pages, 12mo, cloth. ....\$1.50

**Electrical Tables and Memoranda.** By SYLVANUS P. THOMPSON and E. THOMAS. 128 pages, 2 x 2 3/4 inches, roan .....\$0.50

**Johnston's Electrical and Street Railway Directory.** Fourth Year of Publication, 8vo, cloth. ....\$5.00

**Measurements of Electric Currents.** Electrical Measuring Instruments, by JAMES SWINBURNE. Meters for Electrical Energy. By C. H. WORDINGHAM. Edited by T. COMMERFORD MARTIN. Illustrated, 1 folding plate. ....\$0.50

**The Measurement of Electrical Currents and Other Advanced Primers of Electricity.** By E. J. HOUSTON. 429 pages, 169 illustrations. ....\$1.50

**The Electric Railway in Theory and Practice.** By O. T. CROSBY and DR. LOUIS BELL. Second edition, revised and enlarged, 183 illustrations. 8vo, cloth. ....\$2.50

**How to Use Electrical Measurement Apparatus.** By CHAS. P. FREY. A Manual of Practical Information Relating to Electrical Testing. Illustrated. 8vo, paper. ....50c.

**The Electric Transmission of Intelligence.** By PROF. E. J. HOUSTON. And other Advanced Primers of Electricity. 88 illustrations. 12mo, cloth. ....\$1.00

**Dynamos, Alternators and Transformers.** By G. D. KAPP. Giving an exposition of the general principles underlying the construction of dynamo-electric apparatus without the use of high mathematics and complicated methods of investigation. 12mo, cloth. ....\$4.00

**The Science and Practice of Lighting,** as applied to sheets, open spaces and interiors. By W. H. Y. WEBBER. An elementary study. A series of articles contributed to the *Journal of Gas Lighting*, etc. 8vo, cloth. ....\$1.40

**Experimental Electricity.** By E. T. TREVERT. Numerous illustrations. New revised and enlarged edition. 12mo, cloth. ....\$1.00

**Electric Lighting for Marine Engineers ; or How to Light a Ship by the Electric Light and How to Keep the Apparatus in Order.** By SYDNEY F. WALKER. 293 pages, illustrated, 8vo, cloth ...\$2.00

**The Dynamo, Its Theory, Design and Manufacture.** By C. C. and F. WALLIS HAWKINS. 190 illustrations. Thick 12mo, cloth. (The Specialists' Series). ....\$3.00

**Electrical Distribution.** By M. H. KILGOUR, H. SWAN and C. H. W. BIGGS. Its Theory and Practice. 174 illustrations. 12mo, cloth. ....\$4.00

**Portable Electricity: Being a Treatise on the Application, Methods of Construction and Management of Portable Secondary Batteries.** By J. T. NIBLETT. Fully illustrated 8vo, cloth. ....\$1.00

**Practical Dynamo Building.** By L. C. ATWOOD. With Detail Drawings and Instructions for Winding. Giving correct sizes of Wire, Dimensions of Iron, etc. etc., also Diagram for House Wiring. Illustration and Plates. 4to, cloth. ....\$3.00

**The Dynamo, How Made and How Used.** By S. R. BORTONE. Eighth edition, with additional matter and illustrations. 12mo, cloth. ....\$1.00

## ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

Gas Heating  
Gas Puddling  
Open Hearth  
Crucible  
Tube Welding

# FURNACES

AND ARTIFICIAL GAS PRODUCERS OF EVERY DESCRIPTION, for ROLLING MILLS STEEL AND TUBE WORKS.

We guarantee to place all Plants erected by us in successful operation.

## HENRY AIKEN,

Consulting Mechanical Engineer

Rooms 203-206 Lewis Block,

PITTSBURGH, PA.

## The Iron-Masters' LABORATORY

Exclusively for the

*Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.*

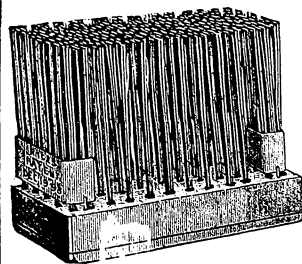
Branch Office, 339 Walnut St., Philadelphia.

All Analytical Work at Warrenton, Virginia.

J. BLODGET BRITTON.

This laboratory was established in 1868, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

### Rice's Pat. Casting Brush



will outwear three of any other kind. Our prices the lowest.

Send for Circular.

THE RICE MFG. CO., New Durham, N. H.

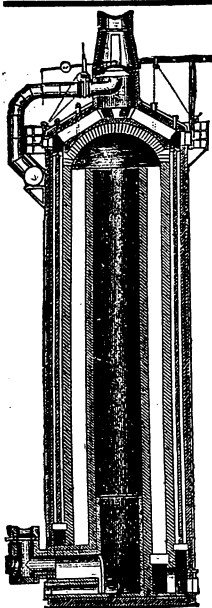


Sent, post-paid, on receipt of price by

**DAVID WILLIAMS, Bookseller and Publisher,**

96-102 Reade Street, NEW YORK.

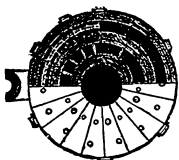
## McCLURE & AMSLER, *Engineers and Contractors*



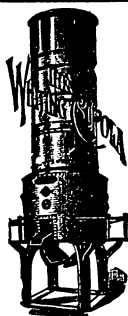
Bissell Block,  
PITTSBURGH, PA.  
**Blast Furnace  
Construction**  
A SPECIALTY.

Sole Agents for  
MASSICK'S & CROOKE'S  
PATENT  
Fire Brick  
Stoves,

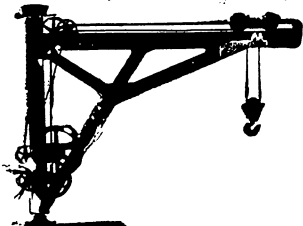
Designs and Estimates  
for the construction of  
Blast Furnace Work,  
and for all kinds of Hot  
Blast Fire Brick or Pipe  
Stoves; and all other kinds  
of Brick Work pertaining  
to Steel Plants, Iron, Brick  
or Wooden Buildings, all  
kinds of Iron Construction  
in general.



**We propose to put into successful  
operation all the plants we design and  
contract for.**



**Whiting Foundry Equipment Co.,**  
225 Dearborn St., Chicago,  
SUCCESSORS TO  
**DETROIT FOUNDRY EQUIPMENT CO.**  
**CRANES,**  
**CUPOLAS,**  
**LADLES,**  
**TUMBLERS, TRUCKS, &c., &c.**



**The Prospector's Field-Book and Guide in the  
Search for and the Easy Determination of Ores and  
other Useful Minerals.** By Prof. H. S. OSBORN,  
LL.D. EXTRACT FROM THE PREFACE: In the  
following pages we have attempted to present such  
a view of the whole subject of prospecting for the  
useful minerals that any liberally educated reader  
may fully comprehend our meaning. We have  
therefore explained special terms where we have  
thought it convenient to use them, and where the  
technically educated student would not need an  
explanation. The table of contents and index have  
both been carefully prepared, and being very full,  
will make reference to any subject in the volume  
easy and satisfactory. 44 engravings. 175 pages  
\$1.50

For sale by David Williams, 96-102 Reade St., N. Y.

## THE D. R. LEAN COMPANY, Blast Furnace and Steel Plant Construction,

Penn Building, Pittsburgh, Pa.

**J. A. HERRICK, M. E.,**  
Consulting Engineer and Contractor:  
Room 609, 284 Pearl Street, NEW YORK.  
— **STEEL CASTING PLANTS A SPECIALTY.** —  
Melting and Heating Furnaces of ALL KINDS.  
Patent Gas **WATER VALVES.** Improved "BASIC" and "SEMI-  
STEEL" Processes and FURNACES.  
New CONTINUOUS Gas PRODUCERS.

## PHILADELPHIA CORLISS ENGINES,

Air Pumps. Condensers, Feed Water Heaters,  
Steel Plate Chimneys, Iron Tanks, Stand  
Pipes, Steel Buildings.

**BLAST FURNACES. HOT BLAST STOVES.**

## Philadelphia Engineering Works, Ltd.,

Philadelphia, Pa., U. S. A.

Selling Agents:

New York, Wm. M. Power, 121 Liberty St.  
Chicago, Wm. F. Farish Machinery Co., Home Insur-  
ance Building.

Buffalo, Roscoe H. Aldrich, 42 Builders' Exchange.  
Rochester, W. J. Creelman, 318 Granite Building.  
Charlotte, N. C., Mecklenburg Iron Works.

## JULIAN KENNEDY.

Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

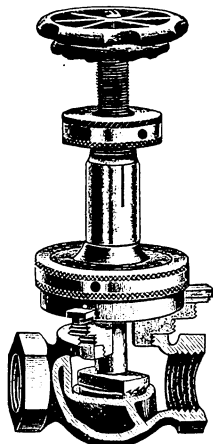
Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills,

**STEAM AND HYDRAULIC MACHINERY, &c.**

— Branch Office of The Latrobe Steel Works. —

## Stop the Leaks!

Invest in a **Morse Valve Reseating Machine**,  
an indispensable money-saving outfit for re-  
pairing all Flat and Taper Seated Valves and  
Water Faucets, making them absolutely  
Steam Tight, without removing the valves  
from the Pipe. Will pay for itself in a few  
weeks' time in any steam plant. Perhaps you  
would like to know how others like it; if so  
write for "How to Stop the Leaks."

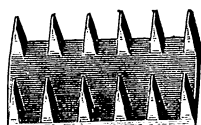


Pat'd June 10, 1890,  
July 28, Sept. 12, Oct. 2  
1891, Sept. 5, 1893.

**The Leavitt Machine Co.,**

ORANGE, MASS.

## MALLEABLE BELT HOOKS AND AXE AND HAMMER WEDGES.

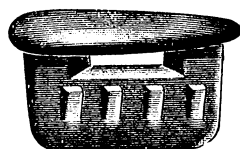


CLINCHING BELT HOOKS,  
ALL SIZES.

Send for Prices.

**SAWYER HARDWARE & SUPPLY CO.,**

PAWTUCKET, R. I.

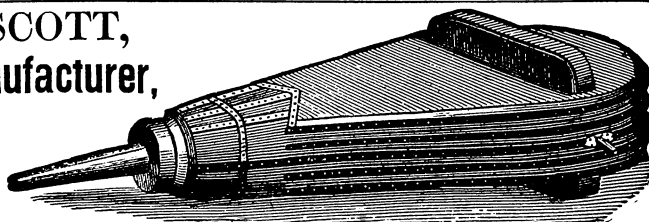


**GEO. M. SCOTT,**  
**Bellows Manufacturer,**

Johnson Street

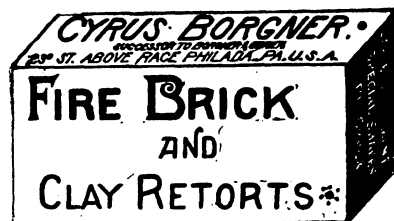
Cor. 22d St.,

CHICAGO, ILL.





**M. D. VALENTINE & BRO CO.**  
**FIRE BRICK**  
 CUPOLA LININGS A SPECIALTY.  
 WOODBRIDGE, N. J.



ESTABLISHED 1856.

**HENRY MAURER & SON,**  
 MANUFACTURERS OF  
**FIRE BRICK**  
 of all Shapes and Sizes,  
 420 E. 23d St., New York.

**B. KREISCHER & SONS,**  
**FIRE BRICK**

BEST AND CHEAPEST.

ESTABLISHED 1845.

Office, foot of Houston Street, East River, NEW YORK.

ESTABLISHED 1864.

**JAMES GARDNER & SON,**  
 MANUFACTURERS OF  
 "STANDARD SAVAGE" FIRE BRICK  
 TILE and FURNACE BLOCKS  
 OF ALL SHAPES AND SIZES.

WORKS, Ellerslie, Allegheny Co., Md.  
 OFFICE, Cumberland, Md., P. O. Box 540.

S. M. Hamilton & Co., Agents, - Baltimore, Md  
 Stowe, Fuller & Co., Agents, - Cleveland, O.

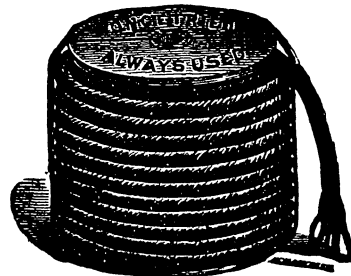
Established 1848.

**Ostrander Fire Brick Company**

Manufacture Fire Brick for all purposes.

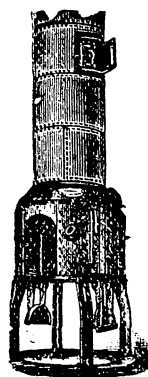
Works at TROY, N. Y., and OSTRANDER, N. J.  
 Main Office, TROY, N. Y., to which correspondence  
 should be addressed.

Export Agent, J. W. D. Melghan, 111 Water St.,  
 New York City.



Send for a Sample of  
**Morrison's Patent Self-Lubricating Packing**

**ROBT. MORRISON,**  
 5034 Arsenal St., St. Louis, Mo.



**THE COLIAU PATENT  
 Cupola Furnace**

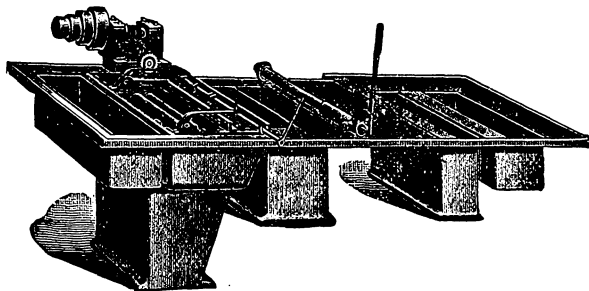
LEADS ALL OTHERS IN  
**ECONOMY,  
 CAPACITY  
 DURABILITY.**

Correspondence Solicited.  
**BYRAM & COMPANY,**  
 Exclusive Manufacturers,  
 DETROIT, MICH.

**THE LLOYD BOOTH CO.,**

**YOUNGSTOWN,  
 OHIO.**

**Tinning  
 MACHINERY.**



**Rolling Mills,  
 Sand and Chilli  
 ROLLS.**

STARTED,  
 REGULATED,  
 STOPPED, } With One  
 Handle.

The most complete Injector  
 on the market. Takes  
 water at a temper-  
 ature of 150 de-  
 grees.

**The Eynon-Evans Mfg. Co.,**  
 PHILADELPHIA, PA.

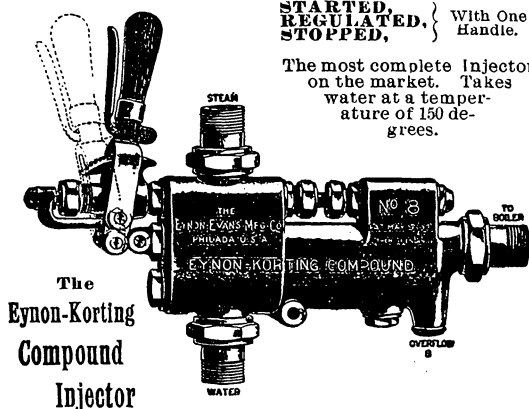
—MANUFACTURERS OF—

Injectors, Condensers for Mine  
 Pumps, Blowers for Boilers,  
 Ventilators, Exhausters,  
 Syphons, Valves, Etc.

The most complete Brass Foundry  
 in Pennsylvania. Capacity 7,000  
 pounds per Heat.

WRITE FOR PRICES.

Send for Valve and General  
 Catalogues.

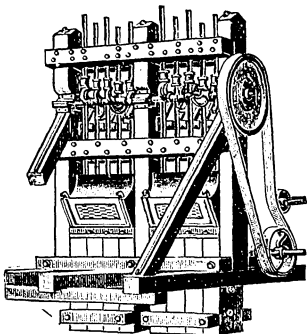


The  
 Eynon-Korting  
 Compound  
 Injector

**The Edward P. Allis Company,**

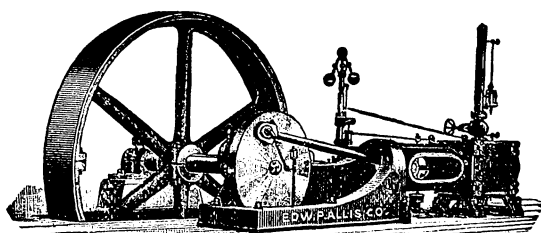
**MILWAUKEE, WIS.,**  
 MANUFACTURERS OF

BLOWING ENGINES,  
 HOISTING ENGINES,  
 PUMPING ENGINES,  
 AIR COMPRESSORS,  
 SPECIAL ENGINES  
 FOR  
 ELECTRIC LIGHTS,  
 STREET RAILWAYS  
 AND  
 ROLLING MILLS,



ORE CRUSHERS,  
 CRUSHING ROLLS,  
 STAMP MILLS,  
 CONCENTRATORS,  
 GENERAL MINING,  
 MILLING AND  
 SMELTING  
 MACHINERY.

REYNOLDS'  
 PATENT  
 VERTICAL  
 BOILERS.



REYNOLDS'  
 CORLISS  
 ENGINES.

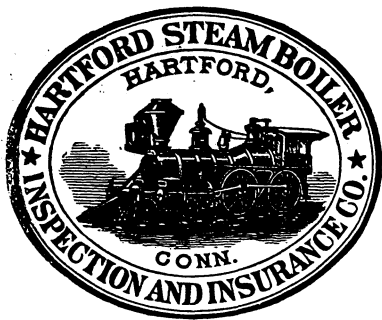
NEW YORK:  
 26 Cortlandt St., Room 1111,  
 F. A. Larkin, Mgr.

MINNEAPOLIS:  
 416 Corn Exchange, J. F. Harrison, Mgr.

CHICAGO:  
 509 Home Ins. Building,  
 J. B. Allan, Mgr.

SAN FRANCISCO:  
 31 Main St.,  
 D. B. Hanson, Mgr.

DENVER:  
 1316 18th St., W. H. Emanuel, Agt.



# THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

## Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas.

### BOARD OF DIRECTORS:

J. M. ALLEN, President.

FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.

CHARLES M. BEACH, of Beach & Co.

DANIEL PHILLIPS, of Adams Express Company.

RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.

LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.

GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.

NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.

HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.

EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.

GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.

HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.

C. C. KIMBALL, Pres. Smythe Manufacturing Co., Hartford, Conn.

PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

## THE C. & C. ELECTRIC COMPANY,

—MANUFACTURERS OF—

### MULTIPOLAR DYNAMOS, DIRECT DRIVEN OR BELTED,

IN SIZES UP TO 250 H.-P.

Bipolar Dynamos up to 100 H.-P. Electric Motors, Automatic or Hand Controlled. Complete Plants for Power Transmission. Isolated Lighting Plants. Central Station Apparatus.

General Office, 143 Liberty St., New York. Works, Garwood, N. J., on Central R. R. of N. J.

BRANCH OFFICES: CHICAGO, Monadnock Building. BOSTON, 63 Oliver Street. CLEVELAND, Cuyahoga Building. PHILADELPHIA, 633 Arch Street.

### NOW READY.

## HENDRICKS' ARCHITECTS AND BUILDERS' GUIDE

—AND—

### Contractor's Directory of America

—FOR—

BUILDERS, CONTRACTORS, MANUFACTURERS AND DEALERS IN ALL KINDS OF BUILDING SUPPLIES.

A Complete Directory of all the Construction Industries of the Country, containing over 180,000 Names. Addresses and Business Classifications, comprising Builders and Contractors of Material and Construction in the Building and kindred Industries. With Full lists of the Manufacturers of and Dealers in Everything employed in the Manufacture of Material and Apparatus used in these Industries—from the Raw Material to the Manufactured Article, and from the Producer to the Consumer.

Architects; Arch'l Wood Workers; Car Builders; Carpenters; Builders and Contractors of all kinds; Blast Furnaces; Brick Mfrs. (Common, Fire, Ornamental, Paving, Pressed, &c.); Boiler Mfrs.; Bridge Builders; Builders' Hardware; Mfrs. of Building Iron of all kinds; Cement; Cornices; Dumb Waiters; Engine Mfrs.; Engine and Boiler Dealers; Electric Lighting Co.'s Dynamos and Motors; Elevators; Engineers (Civil and Mechanical); Electricians; Fire Escapes; Furnaces; Fire Proof Building Material; Dredging Machinery and Contractors; Dock Builders; Contractors for Railroads (Steam, Electric, Elevated, Cable, Street, &c.); Granite Producers, Dealers and Workers; Granite and Marble Monument Workers and Dealers; Iron and Steel Ceiling and Siding; Iron and Steel Roofing; Lathing (Iron, Steel and Wire); Lightning Rods; Mantel Mfrs. (Iron, Marble, Onyx, Slate, Wood, &c.); Mantels, Grates, Fenders, Tile, &c.; Marble Producers, Marble Dealers and Workers; Mason and Builders' Materials; Paint Mfrs.; Paint, Oil and Glass Dealers; Plumbers' Specialties; Plumbers, Gas and Steam Fitters; Plumbers' Gas and Steam Fitters' Supplies; Roofers and Roofers' Supplies; Steam Supplies (Gauges, Feed Water Heaters, Traps, Valves, Pipe and Boiler Coverings, Cast and Wrought Iron Pipe and Fittings); Steam and Hot Water Heating Apparatus; House Heating Boilers and Heaters; Steam and Hot Water Heating Contractors; Railroad Purchasing Officials; Radiators; Rolling Mills, &c.; Sashes, Doors and Blinds; Skylights; Stone Dealers; Terra Cotta; Varnishes; Ventilators; Vault and Sidewalk Lights; Weather Vanes; White Lead Mfrs.; Wire Mfrs. and Workers; in fact everything connected with the Building Industries.

FOR THE YEARS 1894-95.

PRICE . . . FIVE DOLLARS.

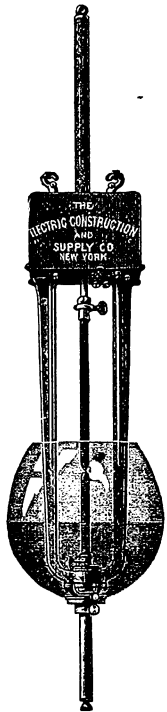
Sent, Post-paid, on Receipt of Price, by

DAVID WILLIAMS, - - - Publisher and Bookseller,

96-102 Reade Street, New York.

# Do You Need Light, And Good Light, And Cheap Light ?

## ARC LAMPS WILL GIVE IT TO YOU.



We are selling now our Standard Arc Lamps for direct incandescent circuits at **\$12.00 EACH**, complete with globe and resistance, which is the lowest price at which such lamps have ever been sold.

### 30,000 OF THEM IN USE.

Most manufacturers do not understand that they can run **Arc Lamps** on a direct current incandescent dynamo, and obtain, for the horse-power used, more than ten times as much light from **Arc Lamps** as they would from **Incandescent Lights**, consuming the same horse-power.

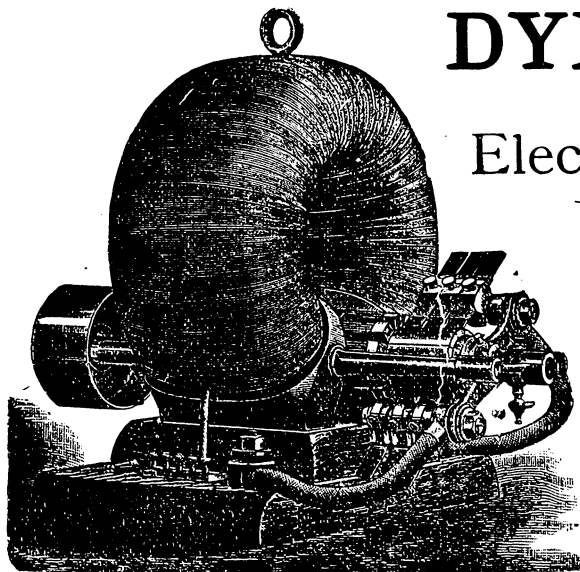
These lamps are used in mills, factories, machine shops, foundries, sheds, and wherever perfect illumination is desired. Large outdoor spaces may also be lighted, the only addition necessary to the lamps being a hood to protect them from the weather.

We invite correspondence, and are always glad to furnish estimates for complete installations, including wiring, dynamos and steam plants if desired.

## ELECTRIC CONSTRUCTION & SUPPLY CO.,

WALLACE ELECTRIC CO., Agents,  
307 Dearborn St., Chicago, Ill.

18 CORTLANDT STREET, NEW YORK.  
(Established 1881.)



## DYNAMOS

—FOR—

### Electro-Plating.

**SIMPLE,  
DURABLE and  
EFFICIENT.**

The Best Machine Made.  
Satisfaction Guaranteed.

—THE—  
**Eddy Electric Mfg. Co.**  
Windsor, Conn.

Langbein's New and Splendid Book on the  
Electro-Deposition of Metals.

A COMPLETE TREATISE  
ON

### Electro-Deposition of Metals.

Comprising Electro-Plating and Galvanoplastic Operations, the Deposition of Metals by the Contact and Immersion Processes, the Coloring of Metals, the Methods of Grinding and Polishing, as well as descriptions of the Electric Elements, Dynamo-Electric Machines, Thermopiles, and of the Materials and Processes used in every department of the Art. Translated from the German of Dr. George Langbein, with additions by William T. Brant, editor of the "Techno-Chemical Receipt Book." Illustrated by 125 Engravings. In one volume. 8vo, 404 pages. Price...\$4.00

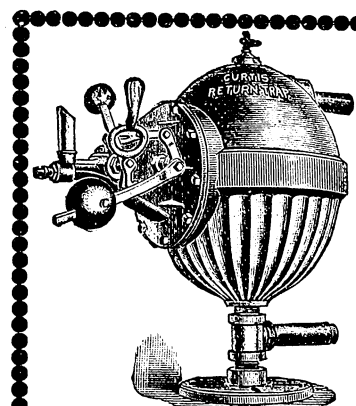
#### Abstract of Contents.

- I. GENERAL HISTORICAL PART. CHAPTER I. HISTORICAL REVIEW OF ELECTRO-METALLURGY.
- II. THEORETICAL PART. CHAPTER II. MAGNETISM AND ELECTRICITY. I. Magnetism. II. Electricity; Electro-Magnetism; Induction; Chemical Actions of the Electrical Current—Electrolysis.
- III. SOURCES OF CURRENT. CHAPTER III. GALVANIC ELEMENTS; THERMO-PILES; MAGNETO AND DYNAMO-ELECTRIC MACHINES.
- IV. PRACTICAL PART. CHAPTER IV. ARRANGEMENT OF ELECTRO-PLATING ESTABLISHMENTS IN GENERAL; ELECTRO-PLATING ARRANGEMENTS IN PARTICULAR. V. TREATMENT OF THE METALLIC ARTICLES. (a) Mechanical Treatment; (b) Chemical Treatment. VI. PROCESSES OF ELECTRO-DEPOSITION; REDUCTION OF METALS WITHOUT A BATTERY (Electro-Deposition by Contact). VII. DEPOSITION OF NICKEL AND COBALT. 1. Nickelling; 2. Cobalting. VIII. DEPOSITION OF COPPER, BRASS AND BRONZE. 1. Coppering; 2. Brassing (Cultrepoli Deposit); 3. Bronzing. IX. DEPOSITION OF SILVER. X. DEPOSITION OF GOLD. XI. DEPOSITION OF PLATINUM AND PALLADIUM. 1. Deposition of Platinum. 2. Deposition of Palladium. XII. DEPOSITION OF TIN, ZINC, LEAD AND IRON. 1. Deposition of Tin; 2. Deposition of Zinc; 3. Deposition of Lead; 4. Deposition of Iron (Steeling). XIII. DEPOSITION OF ANTIMONY, ARSENIC AND ALUMINUM. 1. Deposition of Antimony; 2. Deposition of Arsenic; 3. Deposition of Aluminum; XIV. GALVANOPLASTY (Reproduction). 1. Galvanoplastic Deposition in the Cell Apparatus; 2. Galvanoplastic Deposition by the Battery and Dynamo Machines. XV. COLORING, PATINIZING, OXIDIZING, ETC. OF METALS, LACQUERING. XVI. APPARATUS AND INSTRUMENTS. XVII. HYGIENIC RULES FOR THE WORKSHOP. XVIII. CHEMICAL PRODUCTS USED IN THE ELECTRO-PLATING ART. XIX. USEFUL TABLES. INDEX.

Sent post-paid, on receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade Street, New York.



### The Curtis Patent Return Steam Trap

will return all condensation back to boiler, and will operate equally well in connection with reduced pressure or exhaust steam.

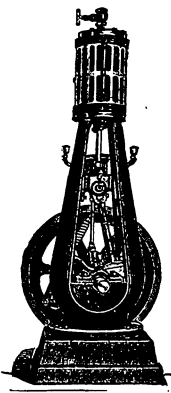
Its general use during the past 10 years is best proof of its superior qualities.

Manufactured by the

D'ESTE & SEELEY CO., 29 to 33 Haverhill St., Boston, Mass.

NEW YORK: 109 Liberty St.  
CHICAGO: 215 Lake St.

**Wm. A. Harris**  
**Steam Engine Co.,**  
 BUILDERS OF  
**Harris-Corliss Engines,**  
 PROVIDENCE, R. I.



Get the Best,  
 High Grade,  
 Low Price,  
 Plain or Automatic  
 VERTICAL STEAM  
 Engine and Boiler.

SEN. FOR PRICE-LIST  
 AND CATALOGUE.

**JOHN WESTWICK  
 & SON,**  
 GALENA, ILL.

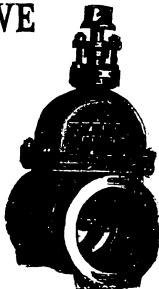
**CHAPMAN VALVE  
 MFG. CO.,**

Manufacturers of

**VALVES & GATES**

For Water, Steam, Gas,  
 Ammonia, &c.

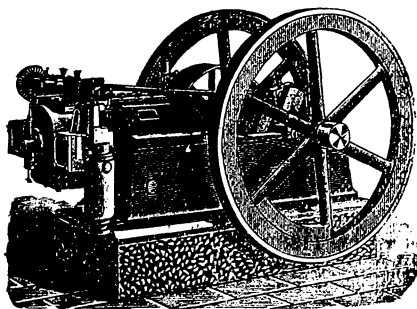
**GATE FIRE HYDRANTS,**  
 With and without independent  
 outlets.



We make a specialty of Valves with Bronze  
 Seats for High Pressure steam.  
 Works and General Office,

**INDIAN ORCHARD, MASS**  
 Treasurer's Office, 72 Kilby and 112 Milk Streets,  
**Boston, Mass.**

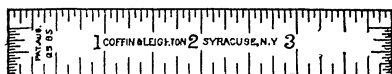
Chicago Office, 24 West Lake St. New York Office  
 28 Platt Street,  
 L. M. Rumsey Mfg. Co., St. Louis, Mo., South-  
 Western Agents.



**Gas and Gasoline  
 ENGINES,**

Using Natural Gas, Coal Gas, Producer,  
 Gas and Gasoline direct from the tank.  
 1 to 40 H. P., actual.

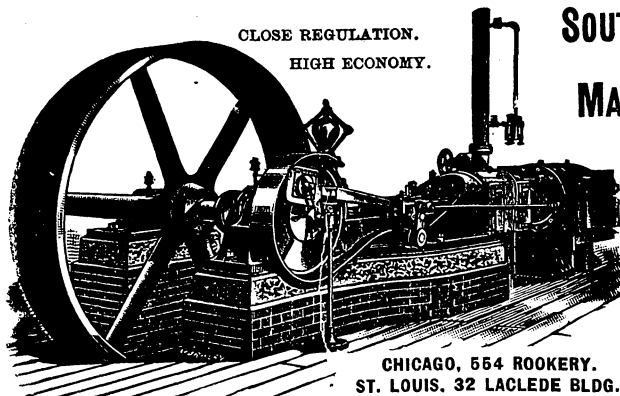
**THE SPRINGFIELD GAS ENGINE CO.,**  
 20 W. Washington St., Springfield, O.



**MACHINISTS' SCALES**  
 PATENT END GRADUATION.

Liberal Discount to the Trade. Send for List.

**COFFIN & LEIGHTON** Syracuse, N. Y.



CLOSE REGULATION.  
 HIGH ECONOMY.

**SOUTHWARK FOUNDRY  
 - AND -  
 MACHINE COMPANY,**

Philadelphia, Pa.

Sole Makers of

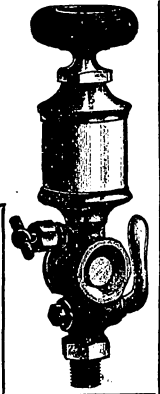
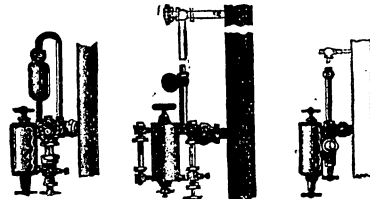
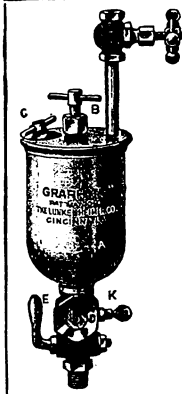
**THE PORTER-ALLEN  
 AUTOMATIC ENGINE,**

SIMPLE, COMPOUND  
 OR TRIPLE EXPANSION.

Also Builders of  
**BLOWING ENGINES,  
 REVERSING ENGINES,  
 CENTRIFUGAL PUMPS,  
 BOILERS, TANKS, ETC.**

CHICAGO, 554 ROOKERY.  
 ST. LOUIS, 32 LACLEDE BLDG.

**SIGHT FEED LUBRICATORS**



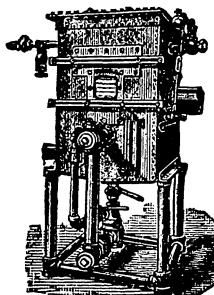
Are a drug on the market. If you  
 want successful Cups, you want  
 "LUNKENHEIMER'S." We make  
 the Senior, Junior, Joker, Graphite,  
 Spray-Feed and Gas Engine Lubri-  
 cators. A trial will convince and  
 prove their superiority. Our Cata-  
 logue of valuable Steam Specialties  
 gives full particulars. Have you one?

"LUNKENHEIMER" on Brass Goods means the best. Specify our make  
 and order through your dealer.

**THE LUNKENHEIMER COMPANY, CINCINNATI, O., U. S. A.**

**WE GUARANTEE YOU**

a very considerable saving in the items of water and fuel by the  
 use of our **Vacuum Feed Water Heater and Purifier**,  
 and this means, of course, an extra profit on your output. The  
 "how" will be found in a comprehensive Catalogue, which is  
 yours for the asking, also Catalogues of the **Webster Separator**  
 and **Williames Vacuum System of Steam Heating**.



**WARREN WEBSTER & Co.,**

NEW YORK, 126 Liberty Street.  
 CHICAGO, Monadnock Building.

No. 2.

**CAMDEN, N. J.**

**STEAM**

— IS RELIEVED OF —

**OIL AND WATER**

By passing through Webster Separators.

SEND FOR COPY OF TESTS AND CATALOGUE TO

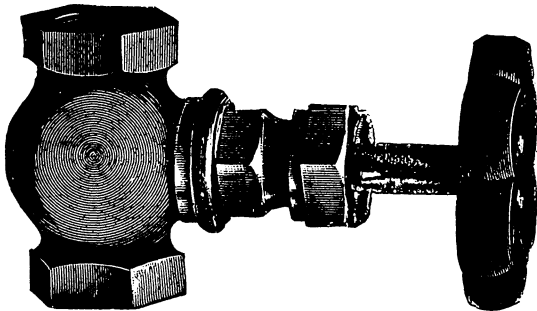
**WARREN WEBSTER & CO.,**

**Camden, N. J.**

**BLAST FURNACES,  
ROLLING MILLS,  
STEEL WORKS,  
MINES, ETC.,  
ETC.**



**OIL WELLS,  
REFINERIES,  
ELECTRIC LIGHT PLANTS,  
WATER WORKS, ETC.,  
ETC.**



**McNAB & HARLIN MFG. CO.,**  
—MANUFACTURERS OF—  
**BRASS COCKS AND VALVES**  
For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless  
Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



**THE CONTINENTAL IRON WORKS**

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS IN THE UNITED STATES OF—

**CORRUGATED FURNACES, FOR MARINE AND  
LAND BOILERS.**

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.

Thos. F. Rowland, Pres. Warren E. Hill, }  
Thos. F. Rowland, Jr., Treas. Chas. H. Corbett, } Vice-Pres.

**Bass Foundry & Machine Wks.**

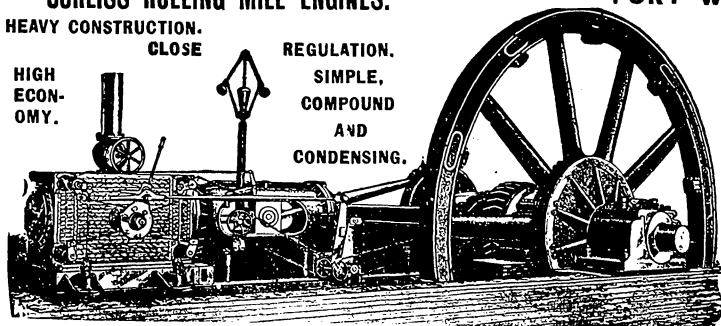
CORLISS ROLLING MILL ENGINES.

HEAVY CONSTRUCTION.

HIGH  
ECON-  
OMY.

CLOSE

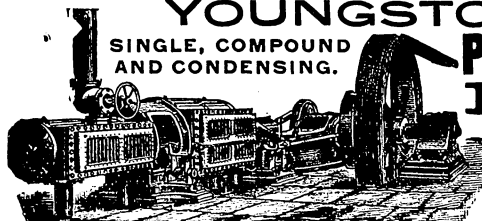
REGULATION.  
SIMPLE,  
COMPOUND  
AND  
CONDENSING.



FORT WAYNE,  
IND.

Boilers  
and  
Complete  
Steam  
Outfits.

**WILLIAM TOD & CO.,**  
YOUNGSTOWN, OHIO.



SINGLE, COMPOUND  
AND CONDENSING.

**PORTER-HAMILTON  
ENGINE**

Blowing Engines,  
Hydraulic Cranes & Accumulators  
Heavy Special Machinery.  
ENGINE CATALOGUE ON APPLICATION.

The Improved  
**WHARTON - HARRISON  
SAFETY BOILER,**

For all Power and Heating Purposes.  
Single Boilers 2-240 H.-P.  
Batteries of any Capacity.

THE COCHRANE  
FEEDWATER HEATER.

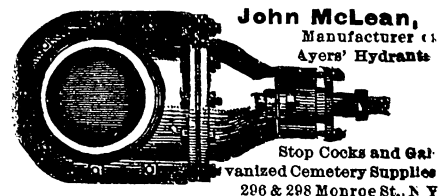
THE COCHRANE  
FEEDWATER HEATER & PURIFIER.

THE COCHRANE  
SEPARATOR.

Horizontal or Vertical Form. For Obtaining  
Dry Steam. Purified Exhaust.

FOR PARTICULARS ADDRESS

Harrison Safety Boiler Wks.,  
Germantown Junction. PHILADELPHIA, PA.

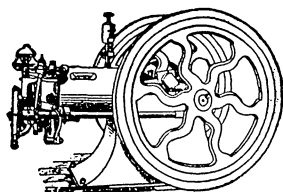


John McLean,  
Manufacturer of  
Ayers' Hydrants

Stop Cocks and Gal-  
vanized Cemetery Supplies  
296 & 298 Monroe St., N. Y.

**The "Lambert" Gas and Gasoline Engines.**

POWER from natural gas,  
coal gas and gasoline di-  
rect from tank. 1 to 50 H.-P.  
stationary; 6 to 20 H.-P. port-  
able. Reliable power for less  
than 1 cent per hour per H.-P.  
No boiler, no fire, no steam, no



engineer, no dirt and perfectly  
safe. Suitable for running all  
kinds of manufacturing plants,  
electric light plants and for all  
purposes where reliable power  
is required. Write for descrip-  
tion and price.

THE BUCKEYE MFG. CO., 50, 51, 52 and 53 Division St.,

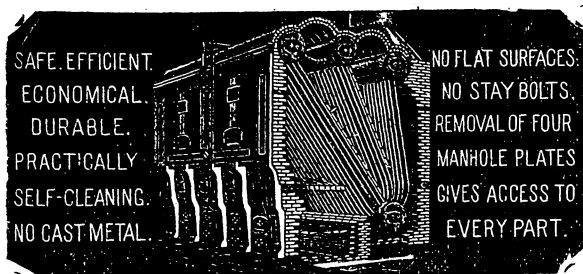
UNION CITY, IND.

**BOSTON GEAR WORKS**

37 Hartford St., Boston, Mass.

HEADQUARTERS FOR GEAR.

Book on Gears, 170 Illustrations, \$1.00. Job Gear  
Cutting of all kinds. Spur, Bevel, Spiral, Ratchet,  
Worm, Rack, Elliptic, Index Plates, &c. Very small  
or large. Send for 1892 Catalogue; 1200 sizes of Gears.

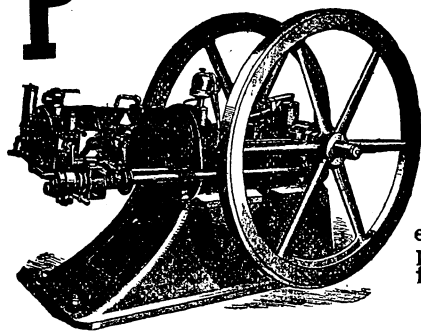


# THE STIRLING WATER TUBE SAFETY BOILER.

74 Cortlandt St., New York.  
418 Walnut St., Phila.  
Cuyahoga Building, Cleveland.

**THE STIRLING CO.,**  
Gen'l Offices, Pullman Building,  
CHICAGO, ILL.

## POWER FROM CASOLINE.



33d and Walnut Sts., PHILADELPHIA, PA.

DIRECT FROM THE TANK.

CHEAPER THAN STEAM. No Boiler. No Steam. No Engineer.

FOR USE EVERYWHERE.

### OTTO CASOLINE ENGINES,

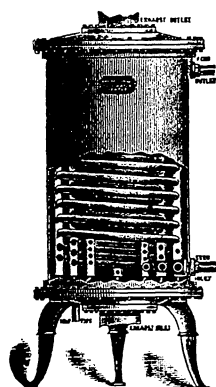
STATIONARY, 1 to 120 H. P., or PORTABLE, 18 to 25 H. P.

Running Expenses, Less than one cent per horse power per hour. For large engines, one-half cent per horse power per hour. Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply. The Best Auxiliary Power for Night Work.

THE OTTO GAS ENGINE WORKS (Incorporated),

CHICAGO OFFICE: 245 Lake St.

BOSTON OFFICE: 19 Pearl St.

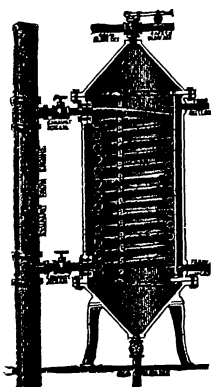
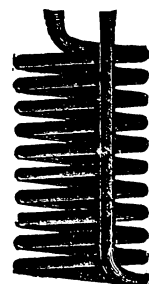


## The National Feed Water Heater

is a BRASS COIL HEATER, delivering water to the boilers at 212° Fahrenheit. It is low in price, but unequalled in efficiency. 500,000 H. P. in daily use attests its merits.

Coils and Bends of Iron, Brass, and Copper Pipe.

THE NATIONAL PIPE BENDING CO.,  
95 River St., New Haven, Conn.



## THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - Boston, Mass.

What you get when you buy the AMERICAN HEATERS:

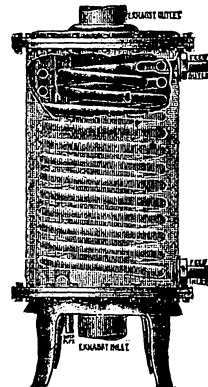
COPPER COILS,  
SOLIDLY BRAZED,  
GUN METAL FITTINGS  
AND CLAMP STAYS,  
STEEL SHELLS,

NO RUSTING OUT,  
NO LEAKY JOINTS,  
NO TROUBLE FROM EXPANSION,  
NO BACK PRESSURE,  
NO OIL IN BOILER.

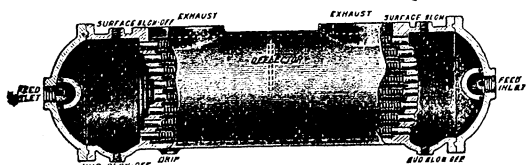
We guarantee this Heater to be the Most Durable, Effective and Cheapest.

**WHITLOCK COIL PIPE CO.,**

27 South Street, - - - - Elmwood, Conn.



## WAINWRIGHT HEATERS.



This cut illustrates the **HORIZONTAL TYPE** of our **WATER TUBE HEATERS**. Our catalogue contains full information regarding several other styles of Heaters also information in regard to Surface Condensers and Expansion Joints. All of these appliances contain corrugated copper tubing. We shall be glad to correspond with you.

**THE TAUNTON (MASS.) LOCOMOTIVE MFG. CO.**

H. S. Walker, 26 W. Randolph St., Chicago, Ill.

W. C. Brown, 39-41 Cortlandt St., New York, N. Y.

The Rowell & Chase Machinery Co., 1217 Union Ave., Kansas City, Mo.



Awarded the Grand Prize at Late Paris Exposition.

BOSTON, MASS. 8 OLIVER ST. PHILADELPHIA, PA. 321 5<sup>TH</sup> ST. CHICAGO, ILL. 910 MASONIC TEMPLE CINCINNATI, OH. 405 WEAVER BLDG. PITTSBURGH, PA. 408 LEWIS BLDG.

**BABCOCK & WILCOX BOILERS**

**THE BABCOCK & WILCOX CO.**

29 CORTLANDT ST. NEW YORK.

SEND FOR BOOK ON STEAM.

NEW ORLEANS, LA. 57 CARondelet ST. SAN FRANCISCO, CAL. SAN FRANCISCO TOOL CO. HAVANA, CUBA. 116 CALLE DE LA HABANA.



SEND FOR CATALOGUE "A."

## Standard Books On METALLURGY

### A Treatise on the Metallurgy of Iron.

Containing outlines of the history of iron manufacture, methods of assay and analyses of iron ores, processes of manufacture of iron and steel, &c. By H. BAUERMAN, F. G. S., associate of the Royal School of Mines. Fifth edition, revised and enlarged. Illustrated with numerous wood engravings from drawings by J. B. JORDAN. 515 pages; cloth.....\$2

### The Metallurgy of Steel.

Volume I. By HENRY M. HOWE, A.M., S.B., mining and metallurgical engineer; illustrated with many engravings and plates. 383 pages; 11 x 14 inches.....\$10

### The Metallic Alloys.

A practical guide for the manufacture of all kinds of alloys, amalgams and solders, used by metal workers; together with their chemical and physical properties and their application in the arts and the industries; with an appendix on the coloring of alloys. Translated and edited chiefly from the German of A. KRUPP and ANDREAS WILDBERGER, with extensive additions by Wm. T. BRANNT; illustrated by 16 engravings; 428 pages; cloth.....\$3.00

### Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mills, the forge and the foundry. By WILLIAM HENRY GREENWOOD, F.C.S. With 97 diagrams; 536 pages; cloth.....\$2

### Electro-Plating.

A practical hand-book on the deposition of copper, silver, nickel, gold, aluminum, brass, platinum, &c. With descriptions of the chemicals, materials, batteries and dynamo machines used in the art. Second edition; carefully revised, with additions. By J. W. URQUHART; 220 pages; cloth.....\$2

### The Metal Worker's Handy Book of Receipts and Processes.

Being a collection of chemical formulas and practical manipulations for the working of all the metals and alloys, including the decoration and beautifying of the articles manufactured therefrom, as well as their preservation. Edited from various sources by WILLIAM T. BRANNT. 530 pages; cloth.....\$2.50

Sent, postpaid, on receipt of price by

**DAVID WILLIAMS,**

Publisher and Bookseller

96-102 Reade St. New York.

**R. POOLE & SON CO.**  
ENGINEERS, FOUNDERS and MACHINISTS.  
BALTIMORE, MD.

MANUFACTURERS AND DESIGNERS OF ALL KINDS OF  
**HEAVY MACHINERY,**  
REQUIRING FIRST CLASS WORKMANSHIP AND MATERIALS.

BAND, ROPE, FLY WHEELS, FRICTION, CLUTCHES, SHAFTING, PULLEYS, and HANGERS.

**MACHINE MOLDED AND PLANED GEARING.**

MACHINERY for WHITE LEAD and FERTILIZER WORKS, GRAIN ELEVATORS and FLOUR MILLS, BRASS, COPPER and TIN PLATE ROLLING MILLS, CABLE and MARINE RAILWAYS.

POOLE-LEFFEL TURBINE WATER WHEELS.  
DREDGING MACHINES.  
CIRCULARS ON APPLICATION.  
IRON CASTINGS of 30,000 LBS. TENSILE STRENGTH.

JUST ISSUED.

## USES OF COMPRESSED AIR,

By ADDISON C. RAND.

134 PAGES, 94 ILLUSTRATIONS, PRINCIPALLY FROM ORIGINAL PHOTOGRAPHS AND DRAWINGS.

This handy volume is the only comprehensive work upon the uses of compressed air; it is accurate, readably written and beautifully printed upon heavy plate paper. Price \$1.00, post-age paid. Order of the publishers,

**THE REPUBLIC PRESS, 14 Lafayette Place, N. Y.,**

The Van Nostrand Co., G. P. Putnam's Sons, of N. Y., Dammell, Upham & Co. (the old Corner Book Store), Boston, Mass., Robt. Clarke & Co., Cincinnati, Ohio, The American News Co., and any bookseller.

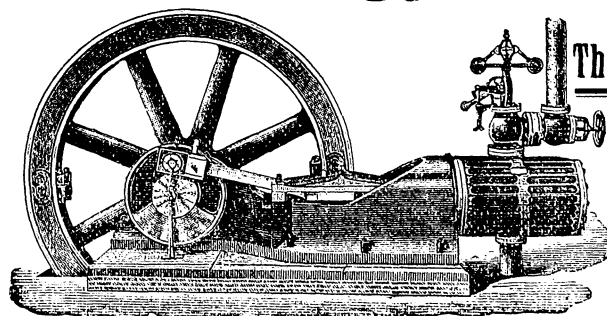
## Totten & Hogg I. & S. F'dry Co.,

Manufacturers of

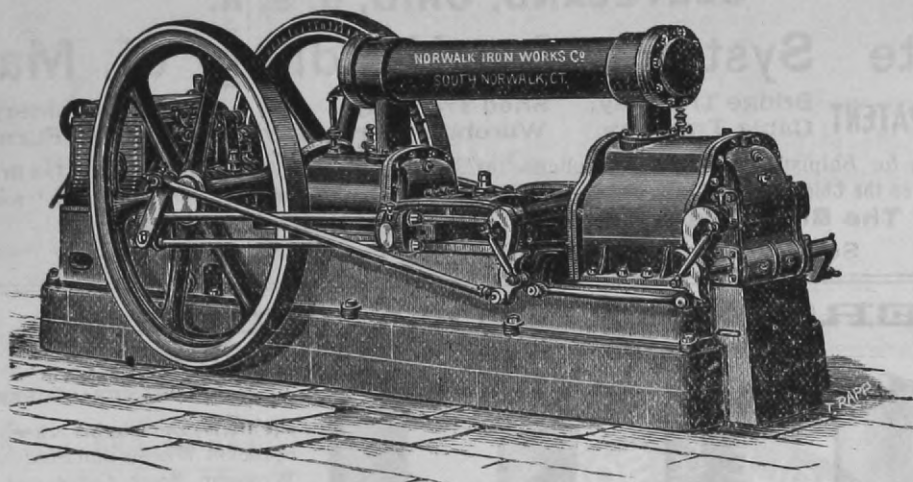
The "Aetna" Rolling Mill

**ENGINE**

Chilled and Sand  
Rolls and Rolling Mill  
Machinery,  
PITTSBURGH, PA.



# Air Compressors.



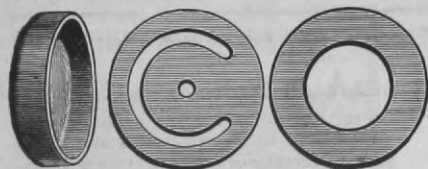
**THE NORWALK IRON WORKS CO., South Norwalk, Conn.**



**CHEAPEST.  
HANDIEST.  
SIMPLEST.**

Handling Dirty, Gritty and Sandy Liquids, without Wear, Oil or Care. Pumping outfits for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging.

**MASLINS, 165-167 First St., Jersey City, N.J.**

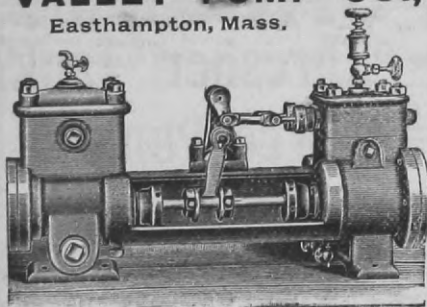


**Pump Leathers  
and LEATHER WASHERS**

MANUFACTURED BY

**Detroit Valve & Washer Co.,  
DETROIT, MICH.**

**VALLEY PUMPS**  
Single and Duplex.  
**VALLEY PUMP CO.,**  
Easthampton, Mass.



**Pumps and Pumping Machinery. Part I. By FREDERICK COLYER, M. Institute C. E. Second edition, revised and enlarged. Synopsis of contents: Lift Pumps.—Driving gear. Beer, tar, vinegar, sewage and well pumps, &c. Force pumps, various kinds. General details of lift and force pumps. Arrangement of engine and pumps. Depth of suction, water towers, &c. Sundry pumps.—Centrifugal, drainage and dock pumps, chain pumps, air pumps, blowing engines and compressors. Engines for working pumps. Horizontal high-pressure engines. Compound engines. Vertical pressure engines. Quadruple-expansion engines. Data of working results, &c., &c. Cornish engines. Beam and bull engines. Fuel consumed. Boilers, vertical, cylindrical, Cornish, Lancashire, multitubular, patent water tube boilers, &c. Engine houses, details of construction, fittings for rooms, &c. Boiler houses. Index. 200 pages. 53 large folding plates to scale. Cloth, 8vo. .... \$10.00**

For Sale by **DAVID WILLIAMS, 96-102 Reade St., N.Y.**

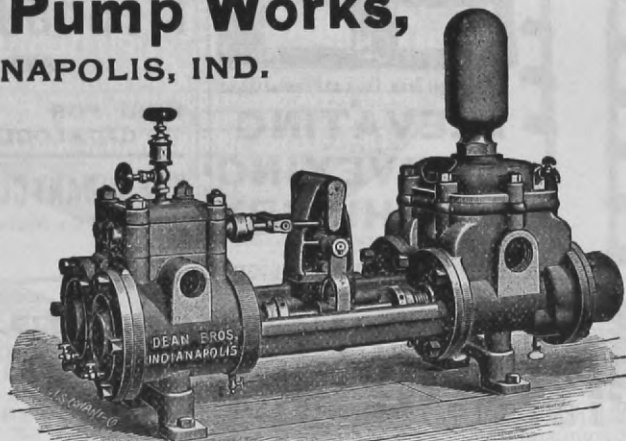
**DEAN BROTHERS'**  
**Steam Pump Works,**  
INDIANAPOLIS, IND.

**DUPLEX PUMPS.**

**SINGLE PUMPS.**

**DEEP WELL  
PUMPS.**

Send for Catalogue  
and Prices.



**The JOHN H. MCGOWAN CO.**

RIVAL STEAM PUMP, TWIN LEVER DUPLEX, 1893 GLIDE BOILER FEEDER, TRIPLEX, DEEP WELL PUMP.

**PUMPS FOR EVERY SERVICE** **CINCINNATI, OHIO.** **PRICE LIST ON APPLICATION**

Factory Office 46 CENTRAL AVE.

Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

**Worthington Steam Pumps**  
**CONDENSERS and WATER METERS.**  
**HENRY R. WORTHINGTON,**

**NEW YORK, 86 & 88 LIBERTY STREET.**

Boston, 70 Kilby St.

Philadelphia, 607 Arch St.

St. Louis, Eighth and St. Charles Sts.

Cleveland, 24 South Water St.

Chicago, 185 to 189 Van Buren St.

**"HOOKER" PUMPS**

HAVE A WORLD WIDE REPUTATION.

MADE ONLY BY

**Hooker-Colville Steam Pump Co.,  
St. Louis, Mo.**

# The Brown Hoisting & Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.

## Complete Systems for Handling of Materials.

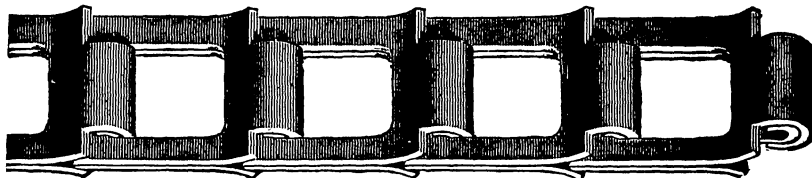
**THE BROWN PATENT** Bridge Tramway. Shed Tramway. Sewer Machinery Tramway.  
Cable Tramway. Warehouse Tramway. Automatic Furnace Hoist.

Traveling Crane for Shipbuilders, a perfect appliance for handling Frames, Armor Plates, etc. The Brown Patent Cantilever Derricks, in use on the Chicago Main Drainage Canal. Working Capacity of Cantilever 500 to 700 yards "solid rock in place" per day of 10 hours. **The Brown Patent Friction Clutch Hoisting Engine.**

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

## ROBERTS MANUFACTURING CO.,

2100 Smallman Street, PITTSBURGH, PA.



— MANUFACTURERS OF —

Patent Detachable Steel Link Belting, Sprocket Wheels and Shafting, also Malleable Wrought Steel Cable and Special Chains, Elevating, Conveying and Mining Machinery, Wire Rope Haulages and Tramways.

SEND FOR CATALOGUE.

**JEFFREY**

Roller, Steel Drag, Cable and Special Chains.  
FOR  
**ELEVATING AND CONVEYING MACHINERY**  
FOR HANDLING MATERIAL OF ALL KINDS.  
Power Transmission Machinery.  
WIRE CABLE CONVEYORS.  
For long & short distance Conveying.

**THE JEFFREY MFG. CO.** 163 Washington St., N. Y.  
Columbus, Ohio. Send for Catalogue.

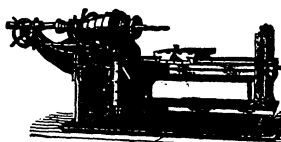
## FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

**FITCHBURG**

AND OTHER

SEND FOR CATALOGUE B.



Horizontal Boring and Drilling Machine.

**ENGINE LATHE**

METAL-WORKING MACHINES.

**FITCHBURG, MASS.**

## THE DURANT COUNTING MACHINES

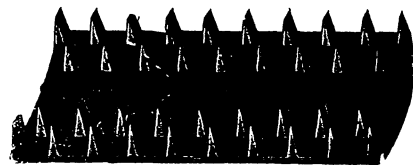
Received the Highest Award at the World's Fair.



Send for Catalogue to

W. N. DURANT, 234 23d St., Milwaukee, Wis.  
English Agent, FRED'K ULLMER, Cross St., Faringdon Road, London, E. C.

Talcott's Original Wilson Belt Hooks.



W. O. TALCOTT, Providence, R. I.

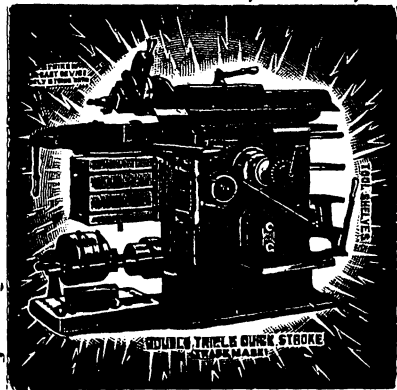
MANUFACTURER OF

Four Styles of BELT HOOKS, including 134 Sizes.  
SEND FOR CATALOGUE.

## FOR THE "Double Triple Quick Stroke" SHAPER

WRITE TO

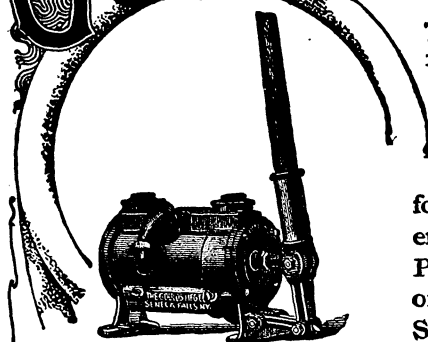
**GOULD & EBERHARDT, Newark, N. J.**



12 in. 16 in., 20 in., 24 in., 28 in., 30 in. stroke.

## GOULDS PUMPS

The "Thresher" Tank  
Force Pump



Is designed to supply the demand for a cheap capacious Pump for Thresher Tank. Better than a Pitcher Spout Pump; cheaper than any other Pump, of equal capacity and adaptation. Send for circular.

## THE GOULDS MANUFACTURING CO.,

Manufacturers of PUMPS and HYDRAULIC MACHINERY,  
Works & Main Offices: Seneca Falls, N. Y., U. S. A. Warehouses: 16 Murray St., New York City.  
Or Nearest Branch Agency—THE GOULD CO., 23 and 24 North Canal St., Chicago, Ill.  
SMITH & WINCHESTER CO., 19 to 27 Wendell St., Boston, Mass. WOODIN & LITTLE, 313 & 314 Market St., San Francisco, Cal.  
E. O. NELSON MFG. CO., Eighth & St. Charles Streets, St. Louis, Mo. L. M. BATES, 321 Vine Street, Philadelphia, Pa.

FOR TESTING IRON AND STEEL SPECIMENS, CAR COUPLERS, BRAKE SHOES, CHAIN, SPRINGS, WIRE, CEMENT.

## RIEHLE TESTING MACHINES,

Hydraulic Pumps and Presses, Robt. Jacks, Marble Machinery, Iron Foundry & Machinists.  
Riehle Bros. Testing Machine Co., 9th St. abv. Master Phila

**LEVIATHAN BELTING.**

Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

Belts for Main Driving and work of a heavy nature a specialty.

**MAIN BELTING COMPANY,**

Sole Manufacturers,  
1219-1235 Carpenter St.  
PHILADELPHIA.

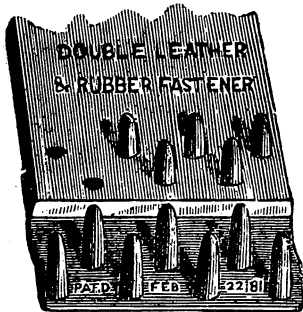
248 Randolph Street, Chicago.  
120 Pearl Street, Boston

Send for Price-Lists and Samples.

**ALEXANDER BROS.**  
**BEST OAK BELTING.**  
PHILADELPHIA.

Patterson, Gottfried & Hunter, Limited, agents,  
146-150 Centre St., New York, N. Y.

Thacher's Patent BELT FASTENERS.



Manufactured by The Claffen Manufacturing Co  
Cleveland, O. Office, 71 and 78 Ontario St.

**A WORD ABOUT****"EX EX" (Trade Mark), No. 604.**

We have made the "Ex Ex" brand of facings for eighteen years, and it is considered by many to be absolutely without an equal.

The well known Press Manufacturers, R. Hoe & Co. and T. Schriver & Co., New York, have been large users of it for fifteen years. Steinway & Sons, New York have also been users of "Ex Ex" Facing for the same length of time. The Niles Tool Works, Hamilton, Ohio, have used it for eight years, and buy in 20 barrel lots. The Philadelphia and Reading R. R. buy 10 barrels at a time, and have used it for the past eight years. The Dickson Manufacturing Co., Scranton, Pa., have been steady users of it for eight years. Davenport & Treacy Co., Stamford, Conn., Bridgeport Brass Co., Bridgeport, Conn., and the Knowles Steam Pump Works, Warren, Mass., have all used it from six to eight years.

The "Ex Ex" can be used both as a wash on dry sand work, or on green sand work, by dusting on a little powdered charcoal.

If the "Ex Ex" is desired on green sand work as a "One-Bag Facing," specify so in your order, and we will make it so by putting in the charcoal here.

For prices and samples address

**JOS. DIXON CRUCIBLE CO.,**

JERSEY CITY, N. J.

**RUBBER GOODS**

MOULDED

Small moulded work a specialty.  
Send for estimates for moulds and work.

FOR MECHANICAL PURPOSES.

H. O. CANFIELD, Bridgeport, Conn.

**PITTSBURGH MFG. CO.,**

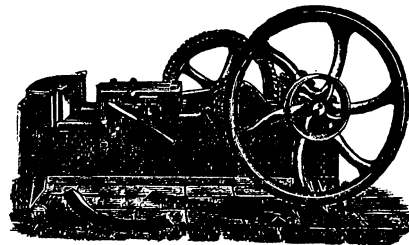
Manufacturers of

**Crosgrove's Patent Straightening, Bending and Punching Machines.**

**NAIL MACHINERY.**

Bolts, Nuts, Rivets, Castings, &c.

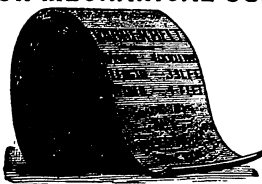
PITTSBURGH, PA.

**NEW YORK BELTING & PACKING CO. LTD**

OLDEST, LARGEST and BEST Makers of

**Rubber Goods**

FOR MECHANICAL USES.



Rubber belting, hose, steam hose, brewer's hose, suction hose, "Test" fire hose, cotton hose, packing, valves gaskets, rings, vulcanite emery wheels, rubber covered rolls, tubing, rubber cement, mats, matting, stair treads, bicycle and vehicle tires, car springs, fruit jar rings, etc. Special goods to order.



GOOD.



BETTER.

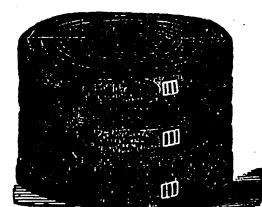


BEST.

Send for Catalogue.

**PIONEERS AND LEADERS.**

15 Park Row, New York.



STORES: Boston, Philadelphia, Chicago, Cincinnati, Minneapolis, Cleveland, San Francisco, Detroit, Baltimore, Charleston, New Orleans, Kansas City, St. Luis, Dallas.

AGENTS WANTED IN UNOCCUPIED TERRITORY.



# E. W. BLISS CO.,

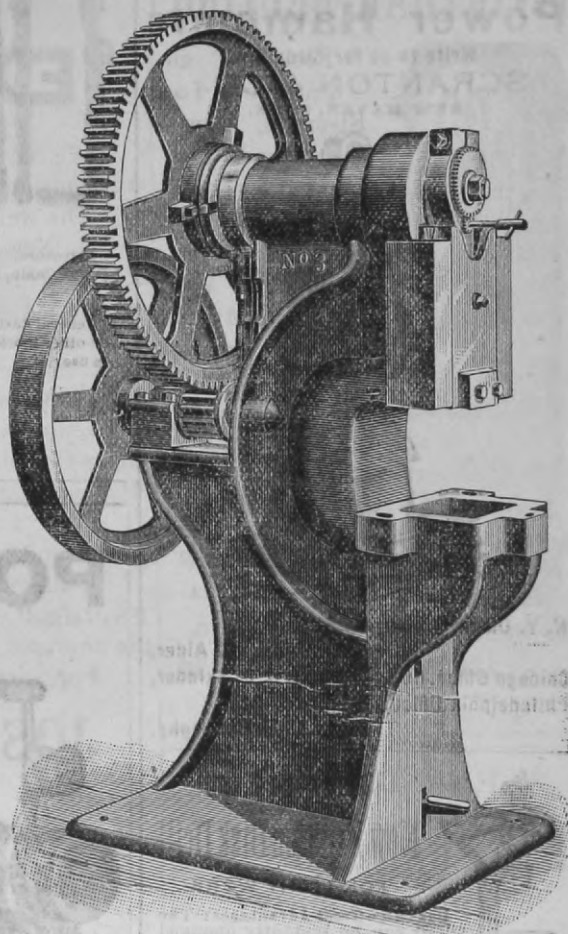
11 ADAMS STREET, BROOKLYN, N. Y.

Western Office.

100-104 W. Washington St., Chicago.

**PRESSES, PUNCHES,  
DOUBLE SEAMERS,  
SHEARS,  
DROP HAMMERS  
FOR HAND AND POWER,  
ALSO  
DIES AND SPECIAL  
TOOLS TO ORDER.**

CATALOGUE AND QUOTATIONS PROMPTLY SENT.



Stiles Geared Press.

## The Stiles & Parker Press Co.

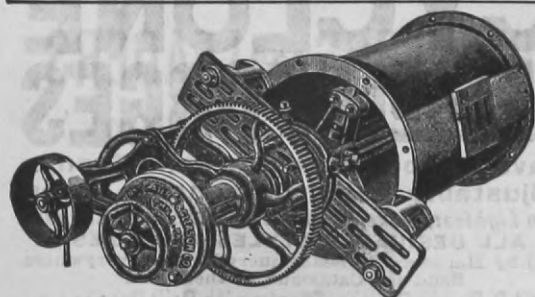


The Dupont Power Hammer.

## The Dupont Power Hammer IS STILL AT THE FRONT.

Manufacturers who have use for a POWER HAMMER will find it to their advantage to write us for circular and prices. Our prices suit the times. Our Hammer is the best and will speak for itself.

## The Dupont Manufacturing Co., ST. JOHNSBURY, VT.



## PORTABLE CYLINDER BORING MACHINE.

For boring IN THEIR PRESENT POSITIONS all makes and sizes of Steam Engine Cylinders, largest size of Locomotive Cylinders, Pumps, Steam Hammers, Air Compressors, Mining and Hoisting Engines, Heavy Housings, Large Wheels, etc. Machines made any size required. Circulars with full description on application.

## HENRY C. AYER & CLEASON CO.,

Office and Works, N. E. cor. 2d and Diamond Sts., Philadelphia, Pa.

Central Office, No. 919 Betz Building, Philadelphia, Pa.

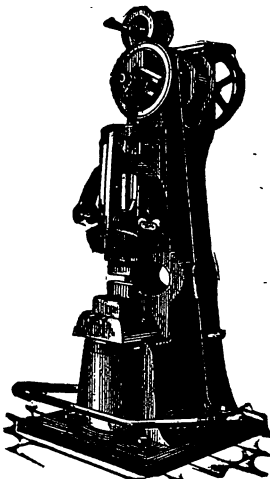
## MILLING MACHINES AND PROCESSES.

A practical treatise on shaping metals by rotary cutters, including information on making and grinding the cutters. By PAUL N. HASLUCK. With upward of 800 engravings, including numerous drawings by the author, 8vo, 352 pages, with 304 engravings, cloth, \$5.00.

Sent, post-paid, on receipt of price by DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

## IF YOU USE Power Hammers

Write to us for Circulars.  
**SCRANTON & CO.,**  
NEW HAVEN, CONN.



N. Y. Office, 15 Murray St.,  
Surpless, Dunn & Alder.  
Chicago Office, 60 S. Canal St. H. O. Skinner.  
Philadelphia Office, 1113 Arch St.,  
Edwin L. McConaughy.

## BARNES' New Friction Disk Drill FOR LIGHT WORK.

Has these Great Advantages: The speed can be instantly changed from 0 to 1600 without stopping or shifting belts. Power applied can be graduated to drive with equal safety the smallest or largest drills within its range—a wonderful economy in time and great saving in drill breakage.

Send for catalogue.

W. F. & JNO. BARNES CO.,  
69 Ruby St., Rockford, Ill.



The Goddard and Columbia  
Blacksmiths' Drills  
ARE THE  
BEST  
Send for  
Catalogue.

ASA GODDARD  
Manufacturer  
Worcester, Mass.

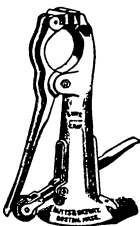
B. & O. Sure Grip Horseshoers'  
Adjustable Jaw Foot-Vise

Should be carried in stock by  
every hardware dealer.

Blacksmiths are calling for it.

Send for List and Discount.

BUTTS & ORDWAY,  
504 Atlantic Ave., Boston, Mass



DRILL PRESSES  
THE LARGEST  
VARIETY  
SEND FOR NEW  
CATALOGUE  
DUNCAN  
MACHINE CO.  
NEW YORK

# LINK-BELT

ENGINEERING CO  
MCCETTOWN,  
P.B.A.  
49 DEY ST.  
NEW YORK

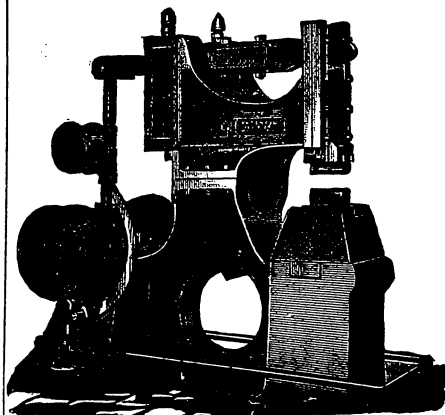
Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting  
Dodge Chain, Howe Chain, &c.

General Eastern Agents for Fibre-Graphite Journal Bearings for shafting and machines. Require no oil  
or other lubricant. Moderate in price, durable and guaranteed. Bearings furnished to fit hangers now  
in use.

WESTERN CONNECTION

[CHICAGO,] LINK BELT MACHINERY CO.

## JENKINS' POWER HAMMERS.



Adjustable and elastic stroke,  
nicety of regulation, efficiency of  
action, simplicity and durability of  
construction and the absence of  
leather straps, steel springs and all  
complication, combine to make this  
hammer the favorite wherever used.

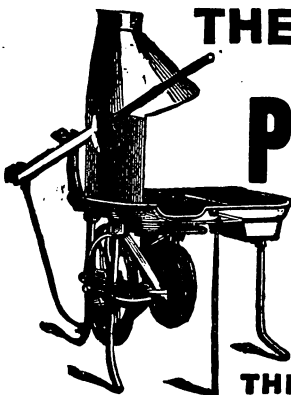
JENKINS & LINGLE

1213 Filbert St., Philadelphia, Pa.  
Works, BELLEFONTE, PA.

**G. A. CROS**  
Manufacture  
**PRESSE**  
SPECIAL MA  
SHEET METAL  
176 178 So. Clinton

**CYCO**  
S. DIES  
CHINERY  
WORKERS  
Sr., Chicago, Ill.

## THE CYCLONE PORTABLE FORGES



Have Double Ratchet, Solid Frame,  
Adjustable Legs, Detachable Lever.  
Run Lightest, Make Strongest Blast & Last Longest.

ALL DESIRABLE STYLES AND SIZES.

Sold by Hardware and Machinery Dealers everywhere.  
Send for Catalogue of these and

Hand & Power Blower, Blacksmith Drill Presses, &c.  
**THE FOOS MFG. CO. SPRINGFIELD, OHIO.**

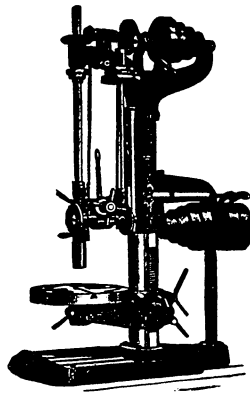
## BOOKS

THE NEWEST BOOKS ON Iron, Steel and Metallurgy  
Mining, Mechanical and Civil Engineering; Casting and  
Founding; Electricity and Electric Lighting, promptly  
supplied on receipt of price by  
DAVID WILLIAMS, 96-102 Reade St., New York.



# Our Specialty:

The best, cheapest and most modern.  
Write us for prices before placing  
orders elsewhere. **The Hamilton  
Mch'e Tool Co., Hamilton, O.,** (West  
Market St.). **Western Store, 57  
So. Canal St., Chicago.**



## Drill Presses.

## Upright Drills.

All sizes, with any capacity. If you are looking for  
Radial, Half and Full Universal Radial Drills, Tap-  
ping Machines, Boring and Turning Mills, write to  
us for prices. We'll make them low enough for you.



**Bickford Drill & Tool Co.**

10 Lawrence St., Cincinnati, O.

## MACHINERY FOR STONE WORKING.

**LINCOLN IRON WORKS,**  
RUTLAND, VT.  
New York Office, 182 Front Street.

Stone Working Machinery, Planers, Gang  
Saws, Rubbing Beds, Derricks and Hoisting  
Powers, also Gear Castings. See list.

Saves its Cost in 3 Months.

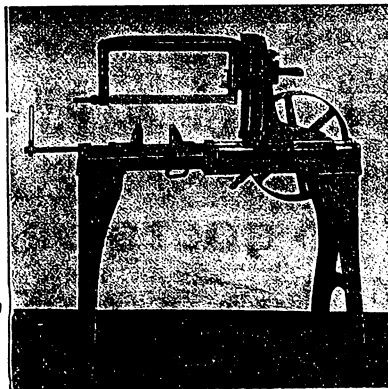
Automatic Variable Feed  
Horizontal Stroke  
Perfect Cutting



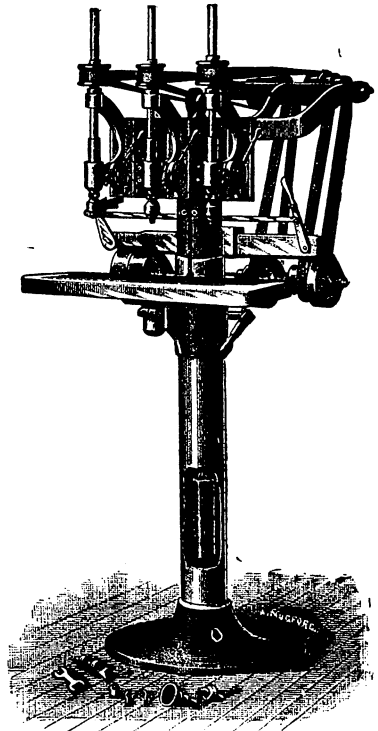
### SHOP SAW

General Offices:  
703-706 W. U. Building,  
Chicago, Ill.

Branch Office: 29 Broadway, New York.



## One, Two and Three Spindle Drills.



In sensitiveness unequalled.  
Will drill up to  $\frac{1}{2}$ -inch holes.  
Every machine warranted to  
run true. Each spindle has  
three changes of speed inde-  
pendent of each other.

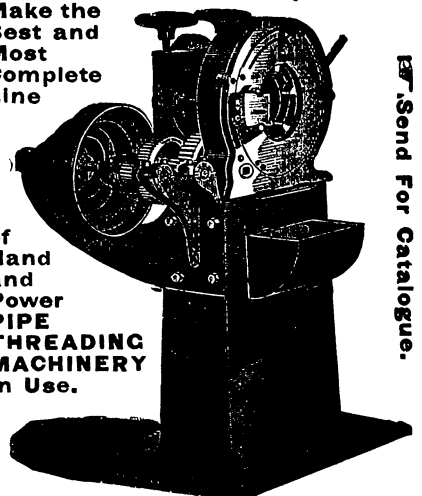
**The Sigourney Tool Co.,**  
HARTFORD, CONN.

Special Machines and Tools Built to Order.

## The Merrill Manufacturing Co.. Toledo, Ohio,

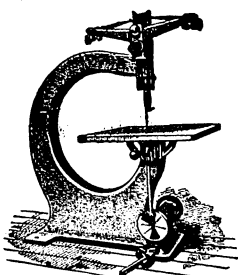
Make the  
Best and  
Most  
Complete  
Line

of  
Hand  
and  
Power  
PIPE  
THREADING  
MACHINERY  
in Use.



Send For Catalogue.

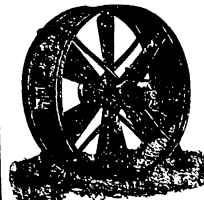
**WOOD** Gold Medal, Antwerp, 1894.  
Largest Line in the World.  
Up **WORKING** Any Want  
to Date. **MACHINERY.** Supplied.  
Originators  
and Makers.



**J. A. FAY & CO.,**

No. 6 Column Fret Scroll Saw. 288 to 308 W. Front St., Cincinnati, Ohio, U. S. A.

To Show You Our Faith in Our Goods



We will wager \$1,000.00  
with any fan manufacturer,  
that there is not another  
make of fan in the United  
States to day that will give  
more air with less power  
than required by our make  
of fan of the same size.

**B. F. PERKINS & SON,**  
16 RAILROAD ST.,  
Holyoke, Mass.

**RELIANCE HYDRAULIC JACKS.**

**SUPERIOR TO ANY JACK NOW MADE.**  
Absolute in its actions in any position.  
Under complete and instantaneous control.



**MADE IN FOUR SIZES,**  
10, 15, 20 and 30-ton capacity, to lift 12 or 18 inches. Broad Base or Ground Lift.

**DIEBELT & EISENHARDT,**  
MAKERS,  
308 Howard Street, Philadelphia.

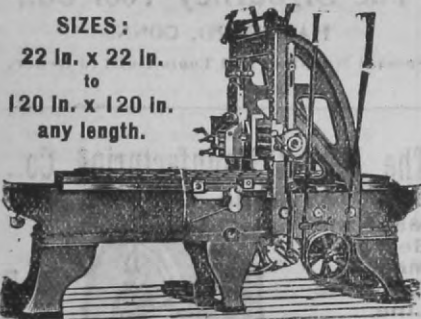
**W. A. Wilson,**  
215-217 North  
Water St.,  
Rochester, N. Y.



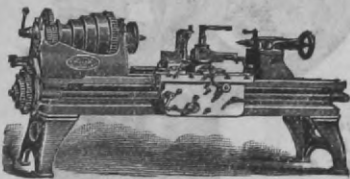
Improved Iron Planers a specialty. 20 x 20, 22 x 22, 24 x 24 up to 42 x 42; to plane any length. Send for description and price-list before purchasing. Manufacturers' agent for other tools and machinery. Mention *The Iron Age*.

**THE POWELL PLANER CO.**

**SIZES:**  
22 in. x 22 in.  
to  
120 in. x 120 in.  
any length.



WORCESTER, MASS.



**NEW HAVEN MANUFACTURING CO.**

NEW HAVEN, CONN.  
Manufacturers of

**IRON-WORKING MACHINERY**

Planers, Shapers, Drills, Slotters, Etc.

**QUINT'S TURRET DRILLS.**  
No. 2 Pattern.

This machine is made with from 2 to 12 spindles. All spindles driven direct by bevel gears. Only the spindle in use revolves. Will drill up to 3/4 inch. Address

A. D. QUINT, Hartford, Conn.

**BEMENT, MILES & CO.,**

PHILADELPHIA, PA.,  
MANUFACTURERS OF

**METAL-WORKING MACHINE TOOLS**

FOR

Railroad Shops,  
Locomotive and Car Builders,  
Machine Shops,  
Rolling Mills,  
Steam Forges,  
Ship Yards,  
Boiler Shops,  
Bridge Works,  
etc., etc.

**Steam Hammers,**  
**Steam and Hydraulic Riveting Machines.**

NEW YORK OFFICE, Taylor Building, 39 Cortlandt Street.

E. H. MUMFORD, Representative.

# Sturtevant Forges.

THE STURTEVANT  
PORTABLE FORGES  
ALL SIZES & STYLES  
B. STURTEVANT © BOSTON, MASS.  
NEW YORK, PHILADELPHIA, CHICAGO, LONDON.

**SOMETHING NEW.****The "M. & P." Friction Drop Hammer.**

Entirely New Principle for Working the Rolls. Positive and Quick Action. Strong and Durable.

**NO BOLTS OR NUTS ON LIFTER**

TO JAR LOOSE.

Miner & Peck Mfg. Co., New Haven, Ct.

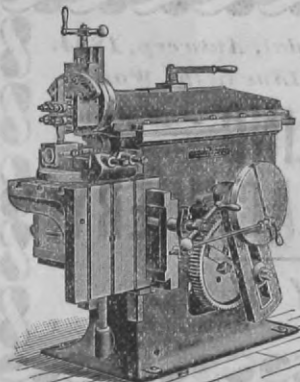
**BIGNALL & KEELER  
MFG. CO.,**  
ST. LOUIS, MO.

MANUFACTURERS OF

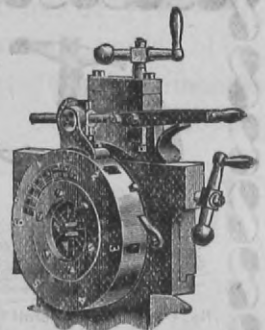
Peerless and Duplex  
Pipe Threading and  
Cutting Machines.

Quickest Die Adjustment. Dies changed without removing head or face plate. Unequaled in output. Emery Surfacers, Shapers, Combination Vises.

Send for Catalogue and mention "Peerless" Head, showing dies closed.



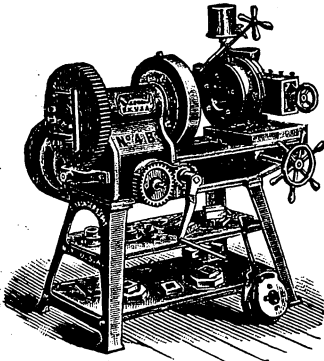
"Peerless Shaper."



dies closed.

**D. SAUNDERS' SONS,**

MANUFACTURERS OF

**PIPE Cutting AND Threading MACHINES**

All sizes  $\frac{1}{4}$  inch to 16 inch for Pipe Mill,  
Gas and Steam Fitters' use. Tapping  
Machines for steam-fittings, also

**STEAM and GAS FITTERS' HAND TOOLS.**

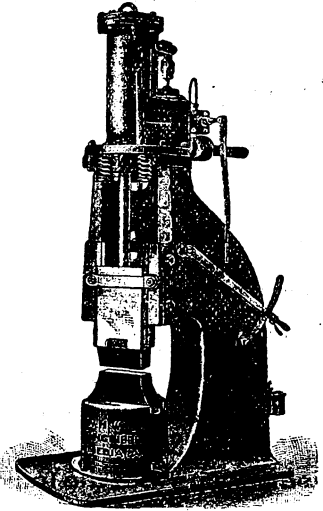
SEND FOR CATALOGUE.

No. 4 B. Machine,  $\frac{1}{4}$  to 4 inch.  
Hand or Power.

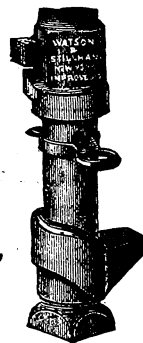
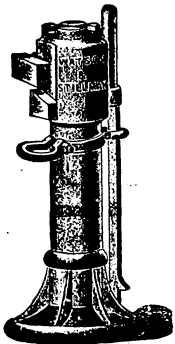
No. 25 Atherton St., Yonkers, N. Y.

**Steam Hammers.**

Steam Hammers.



Steam Hammers.

**HYDRAULIC JACKS.**

PRESSES, PUMPS, ACCUMULATORS,  
VALVES, GAUGES and FITTINGS, HAND,  
HYDRAULIC and POWER PUNCHES  
and SHEARS.

WATSON &amp; STILLMAN, 204-210 E. 43d St., New York.

Send for Catalogue E.

PATENTED  
HYDRAULIC  
MACHINERY.

Riveting Machines.  
Flanging Presses.  
Punching, Shearing  
and Forming  
Machines.

Accumulators, Cranes, Pumps, &amp;c.

WM. H. WOOD,  
Engineer,

Media,  
Penna.

**SENSITIVE DRILLS.**

Modern, Accurate and Well Finished.

(WRITE FOR DESCRIPTION.)

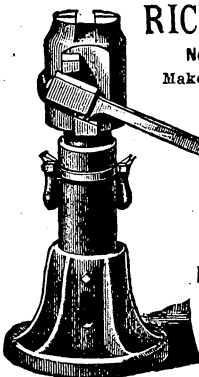
O'Amour & Littledale, 206 E. 43d St.,  
New York

RICHARD DUDGEON,

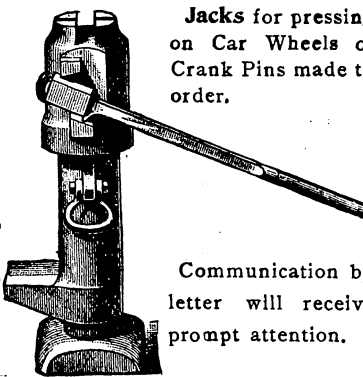
No. 24 Columbia St., New York,  
Maker and Patentee of the Improved

**HYDRAULIC JACKS**

AND

**PUNCHES.**

Roller Tube Expanders  
and Direct Acting  
Steam Hammers.



Jacks for pressing  
on Car Wheels or  
Crank Pins made to  
order.

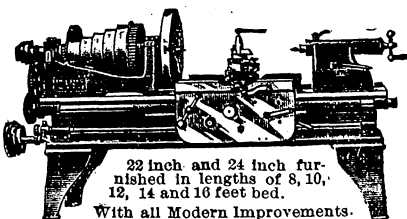
Communication by  
letter will receive  
prompt attention.

**A Treatise on Belts and Pulleys**

Embracing full explanations on funda-  
mental principles, proper disposition of  
pulleys, rules for determining widths of  
leather and vulcanized rubber belts and belts  
running over covered pulleys; strength and  
proportions of pulleys, drums, &c.; together  
with the principles and necessary rules for  
rope gearing and transmission of power by  
means of metallic cables. By J. HOWARD  
CROMWELL, Ph. B., author of a Treatise on  
Toothed Gearing; 271 pages; cloth...\$1.50

Sent postpaid upon receipt of price.

DAVID WILLIAMS, 98-102 Reade St., New York



22 inch and 24 inch fur-  
nished in lengths of 8, 10,  
12, 14 and 16 feet bed.  
With all Modern Improvements.

Dietz, Schumacher & Co.,  
Cincinnati, Ohio, U. S. A.

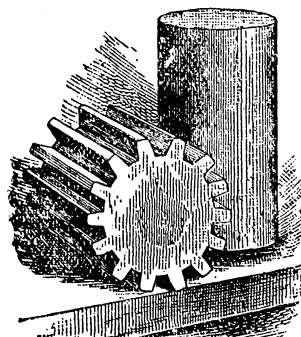
The best is the Cheapest. We make the best.

**Eng. Lathes.****Radial Drills.**

In the many places where  
odd shapes of unusual strength are  
required, or where high velocity is  
necessary, our

**Hydraulic Forgings**

are the most reliable and efficient  
of all materials. Detail information  
promptly furnished upon request.



Billet and Patent Hot-Pressed  
Steel Pinion.

**SPECIALTIES.**

**STEEL BOTTLES**—Air and Gas Receivers  
drawn from the solid STEEL TUBING, for  
Bicycles, High Pressure Boilers, Sleeves,  
Ferrules, Bushings, Collars, etc.

**STEEL PINIONS AND TROLLEY POLES**  
for Electric and Elevator Service, etc.

Correspondence Solicited.

**THE U. S. PROJECTILE CO.,**

1st Ave. and 53d St., BROOKLYN, N. Y.



## BOOKS

—ON—

### Mechanical and Steam Engineering.

#### The Slide Valve Practically explained.

Embracing simple and complete practical demonstrations of the operation of each element in a slide-valve movement, and illustrating the effects of variations in their proportions by examples carefully selected from the most recent and successful practice. By JOSHUA ROSE, M. E. Illustrated by 36 engravings; 100 pages; cloth.....\$1

#### Twenty Years with the Indicator.

Being a practical text book for the engineer or the student, with no complex formulas. By THOMAS PRAY, JR., consulting, constructing, civil and mechanical engineer, &c. Newly arranged; complete in one volume; 284 pages; cloth.....\$2.50

#### Richards' Steam Engine Indicator.

A treatise on the development and application of force in the steam engine. Fourth edition, revised and enlarged. By C. T. PORTER. 273 pages; 20 plates; cloth.....\$3

#### A Manual of Steam Boilers,

their designs, construction and operation. For technical schools and engineers. By PROF. R. H. THURSTON. Second edition; 183 engravings in text; 671 pages; cloth...\$5

#### Constructive Steam Engineering.

A descriptive treatise, embracing engines, pumps and boilers and their accessories and appendages. By JAY M. WHITHAM, M. E., C.E. 900 pages; 795 illustrations, many of which are full page and folding plates; cloth.....\$10

#### The New Catechism of the Locomotive.

Rewritten and enlarged with new matter and illustrations selected from the latest practice in this country. By M. N. FORNEY; 700 pages; cloth.....\$3.50

#### Thermo-Dynamics, Heat Motors and Refrigerating Machines

By PROF. DE VOLSON WOOD. Third edition, revised and enlarged; 452 pages; cloth...\$4

#### Mechanics' and Engineers' Pocket Book.

By CHAS. H. HASWELL. Fifty-fifth edition; 956 pages; leather.....\$4

#### Manager's Hand-Book of Modern Rules,

Tables and Data for Civil and Mechanical Engineers, Millwrights and Boiler Makers, Tool Makers, Machinists and Metal Worker's Iron and Brass Founders, &c. By W. S. HUTTON. Thick 8vo, half-bound.....\$6

#### Valve Gears.

Analysis by Zeuner Diagram. By H. W. SPANGLER, P. A. Engr., U. S. Navy; 160 illustrations; cloth.....\$2.50

Any Book published sent, post-paid, upon receipt of price, by

## DAVID WILLIAMS,

Publisher and Bookseller,

95 - 102 Reade St., New York.

## THE FULL MOUNTED LIGHTNING

These plates have a stock with each die. The dies are our celebrated adjustable Lightning dies. Each stock is of correct length and weight to suit size of die. Several sizes of dies may be in use out of the same set at the same time. Send for catalogue.



Made by WILEY & RUSSELL MFG. CO., Greenfield, Mass., U. S. A. Send for new catalogue.

New York Agency for Wiley & Russell, 120 Liberty St.

## Maule's "Skeleton" Pipe Die

Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

I

The First Cost to you of MAULE'S "SKELETON" PIPE DIE is less than that of any other Pipe-Threading Die—and

2

Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

A sample One-inch "Skeleton" Pipe Die, either  $2\frac{3}{8}$  or  $2\frac{1}{2} \times \frac{3}{4}$  thick, by mail, postage prepaid, will cost you 62 cents, and will be sent upon receipt of a Postal note for that amount.

DO NOT SEND US ANY POSTAGE STAMPS.

You may return such sample to us, at our expense, if, after seeing it, you do not consider it worth the price. Don't the above sound as if it might save you some money—if TRUE?

HENRY B. PANCOAST & CO.,

243-245 South 3d Street, Philadelphia, U. S. A.

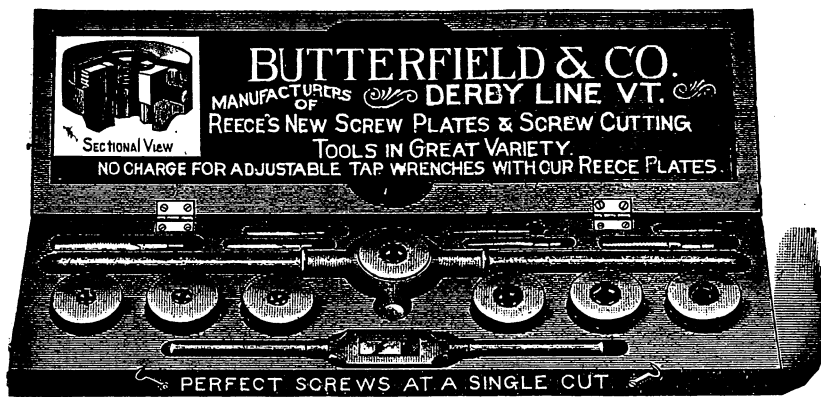
ASK YOUR JOBBER WHAT HE KNOWS ABOUT THIS TOOL.

## JARECKI MFG. CO. (Limited), Erie, Pa.

PIPE THREADING AND CUTTING TOOLS OF ALL DESCRIPTIONS.



Write for Catalogue showing the most complete line of  $\frac{1}{4}$ -inch to 16-inch for hand, belt, engine and with electric motor attachment.  
We can furnish Belt Threading Attachment for this Machine.



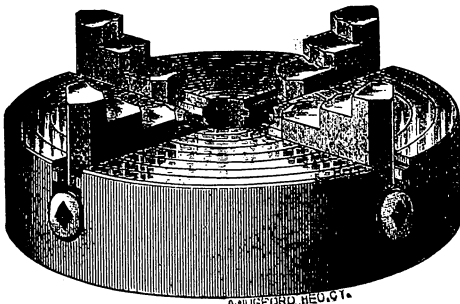
## "CUSHMAN" CHUCKS.

For Lathes, Drills, Chucking and Screw Machines, and for special use.

SEND FOR CATALOGUE.

**The Cushman Chuck Co.,**  
Hartford, Conn.

## CHAMPION INDEPENDENT CHUCKS.



An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

**THE D. E. WHITON MACHINE CO.**

Sole European Agents, SELIG SONNENTHAL & CO., LONDON.

New London, Conn.



Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all. Write for catalogue.

**CHAMPION BLOWER & FORCE CO.,** - - - **LANCASTER, PA.**

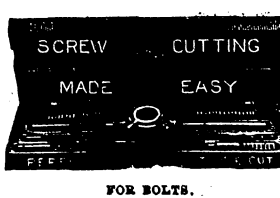


**THE DUPLEX,**  
**Best on Earth.**

30,000 in Daily Use.

**HART MANUFACTURING CO.,**

CLEVELAND, O., U. S. A.



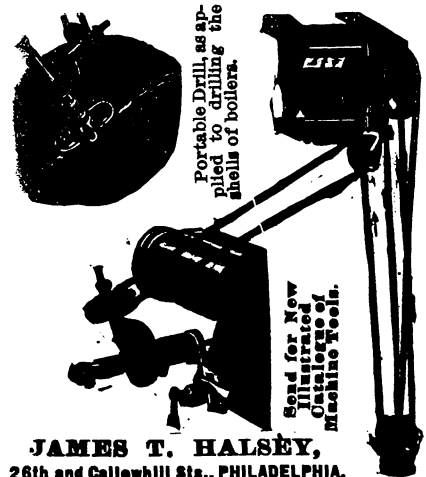
**FRICTION CLUTCHES, SHAFTING, HANGERS, PULLEYS.**

Sheaves for Rope Driving.  
Gear Wheels.

**FRICTION PULLEYS.**

**KEYSTONE**  
**CLUTCH AND MACHINE WORKS,**

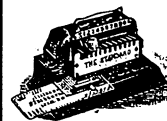
1708-1710 Germantown Ave.,  
PHILADELPHIA, PA.



**JAMES T. HALSEY,**  
26th and Callowhill Sts., PHILADELPHIA.

—THE—

**Standard Automatic Safety Punch.**

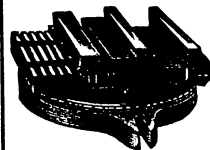


Cuts the figures entirely out. No business man should be without it.

Reduced Price, \$15 net.

The Hoggson & Pettis Mfg. Co.,  
New Haven, Ct.

**SKINNER PATENT CHUCKS.**



Independent Lathe Chucks.  
Universal Lathe Chucks.  
Combination Lathe Chucks  
Lathe Chucks with Patent  
Reversible Jaws. Planer  
Chucks, Drill Chucks, Face-  
Plate Jaws, &c.  
**THE SKINNER CHUCK CO.**  
New Britain, Conn., U. S. A.

**JOHN ADT & SON,**

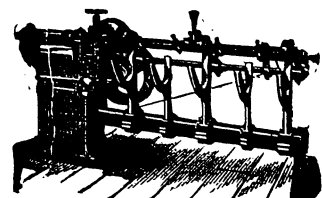
New Haven, Conn.,

BUILDERS OF

**MACHINERY FOR HARDWARE MANUFACTURE.**



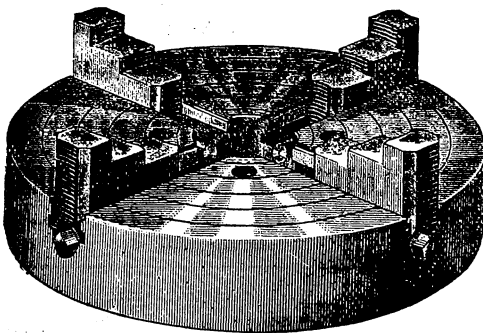
Butt Milling Machinery.  
Butt Drilling Machinery.  
Riveting Machines.  
Wire Straightening Machinery.  
Foot Presses, Sprue Cutters, Etc.



Automatic Wire Straightening and Cutting Machine

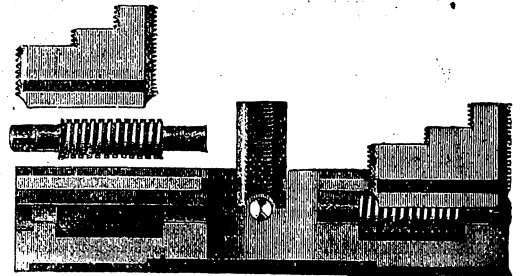
# IMPROVED INDEPENDENT LATHE CHUCK.

No. 18.



DIAMETER.	PRICE.
4 Inch Chuck, Four Jaw,	\$14.00
6 " " " "	18.00
8 " " " "	22.00
10 " " " "	26.00
12 " " " "	30.00
14 " " " "	34.00
15 " " " "	35.00
16 " " " "	38.00
18 " " " "	44.00
20 " " " "	50.00
22 " " " "	57.00
24 " " " "	65.00
30 " " " "	120.00
36 " " " "	210.00

Jaws Reversible.



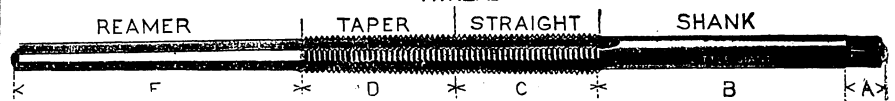
## UNION MANUFACTURING CO. New Britain, Conn.

Warehouse, 103 Chambers Street, New York City.

**THE ARMSTRONG MFG. CO.,**  
—Bridgeport, Conn.—

Pipe Threading  
AND  
Cutting-Off Machines.  
Stocks and Dies,  
Improved Hinged Vises, Pipe  
Wrenches, Pipe Cutters, &c.  
SEND FOR CATALOGUE.  
NEW YORK OFFICE: 139 CENTRE ST.

## STAY BOLT TAPS.



We Make a Specialty of this Style of Tap:

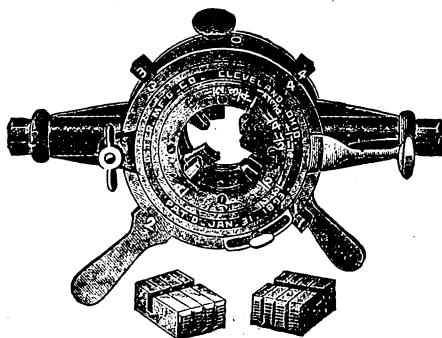
CUT THIS OUT, mark  
Description of TAPS  
used and send to us  
for prices.
**WELLS BROS. & CO.,** GREENFIELD,  
MASS., U. S. A.

**THE**  
"Facile"  
SINGLE  
CHAIN  
BLOCK.

We claim this block to excel in:  
Ease with which the load is raised.  
Low ratio of speed in hand chain.  
Perfect control of load at all points.  
Quick lowering when desired, by "spinning" the hand chain.  
Fewer parts and less wear than other single chain blocks.  
Can be worked at any angle.  
Requires less head room.  
One man raises upwards of 1 ton.  
For sizes and prices apply to

**Jos. F. McCoy Co.,**  
26 Warren Street,  
NEW YORK.

## The Latest and Best.



The Oster Patent Adjustable Die Stocks,  
with Patent Adjustable Positive Stop  
and Cut-Off,

Are built, sold and warranted as the best hand tools for threading and cutting off pipe. They are complete in themselves; no hammer, wrench or other tools required. They are easier to operate, have less weight, more strength and do a larger range of work and more of it in a given time than any in the market. They have all the merits of perfect tools in material, construction and finish. They are furnished at popular prices by wholesale dealers throughout the world. Boxed singly with full printed instructions.

Write for Prices and Discounts to  
**The Oster Mfg. Co.,**  
CLEVELAND, OHIO, U. S. A.

Wire Drawing Machines, **WATERBURY**  
Gang Slitters,  
**MACHINE CO.,**  
Power Presses and Dies, Waterbury, Conn.  
Tumbling Barrels,  
**MANUFACTURERS.**  
Special Machinery.

Send For Prices.

Electric Motor Construction for Amateurs.  
By C. D. PARKHURST.

Gives directions and working drawings for making an electric motor to run sewing machines, small lathes, etc., with rules for constructing the battery to furnish the electrical current, and much practical relative information.  
A table indicating the difference in wire gauges is included.

Price, \$1.00.

Sent, post-paid, upon receipt of price, by  
**DAVID WILLIAMS, Publisher and Bookseller**  
96-102 Reade Street, New York

**THE NEW GIANT DRILL CHUCK.**  
Holds a Drill With the Grip of a Giant. All Steel  
Parts Interchangeable.  
SIMPLE IN CON-  
STRUCTION.  
EASY TO TAKE APART AND CLEAN. BEST OF WORKMAN-  
SHIP AND VERY CHEAP. Manufactured and sold by  
**THE SMITH & EGGE MFG. CO.,** Bridgeport, Conn.

**The WATERBURY-FARREL FOUNDRY & MACHINE CO.,** Waterbury, Connecticut,  
Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from  
Sheet Brass, Copper, Steel, Silver, &c., **POWER PRESSES, HYDRAULIC PRESSES,**  
Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel  
Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.



# THE STANDARD TOOL CO.,

Factory, Cleveland, Ohio.

New York Office, 33 Chambers St.

MANUFACTURERS OF

## INCREASE TWIST DRILLS, REAMERS, TAPS, MILLING CUTTERS AND CHUCKS.

Taper Shank  
Drills,  
St. Shank Drills,  
Screw Driver Bits,  
Reamers,  
Shell and solid  
Taper Reamers,  
Spring Cutters and  
Flat Spring Keys.



WOOD BORING BRACE DRILLS. Will cut off nails,



Drills with 1/2 inch Shanks for Blacksmiths' Drill Presses

SEND FOR CATALOGUE.

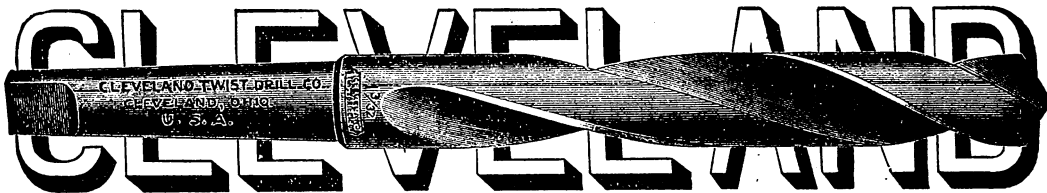
Hand Taps,  
Mach. Screw Taps,  
"Standard" Drill  
Chucks,  
Emery Wheel  
Dressers,  
Sq. Shank Drills for  
Ratchets,  
Twist Drills for  
Blacksmiths'  
Presses.

1874.

OLD RELIABLE.

1894.

SEND  
FOR  
CATALOGUE.



WRITE  
FOR  
DISCOUNTS.

Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.



They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

## MORSE TWIST DRILL & MCH. CO.,

## STOW FLEXIBLE SHAFT,



DRILLS, REAMERS, CUTTERS,



BEACH CHUCKS, TAPS, DIES.



Factory, NEW BEDFORD, MASS.

Catalogues on application.

## MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO'S



Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in V, U. S. Standard and Whitworth shape of threads.



111 Liberty Street,

NEW YORK.

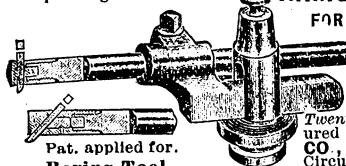
Drop Forged of Steel.

## ARMSTRONG PATENT TOOL HOLDERS.

FOR TURNING, PLANING AND BORING METALS.

Used and Indorsed by such firms as  
J. A. Fay & Co., The Egan Co., Frick Co.,  
Morse Twist Drill & Machine Co., Wiley  
& Russell Mfg. Co. and many other  
large concerns.

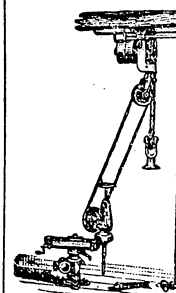
Twenty Thousand Already in Use. Manufactured  
only by **ARMSTRONG BROS. TOOL CO.**, 78 Edgewood Ave., Chicago, Ill. Send for  
Circulars.

Pat. applied for.  
Boring Tool.Pat. Feb. 28,  
1893.

Invented and  
Manufactured by  
**THE**  
**STOW MFG. CO.,**  
Established 1875. Binghamton,  
N. Y.  
**PORTABLE,**  
DRILLING  
TAPPING,  
REAMING.

General European Agents,  
**SELIG SONNENTHAL & CO.,**  
45 Queen Victoria St.,

LONDON, ENGLAND.



**Thos. H. Dallett & Co.,**  
York St. and Sedgley Ave.,  
PHILA.  
MANUFACTURERS OF  
*Portable Drills, Hand  
Drills, Boiler Shell  
Drills, Electric Motors  
especially adapted for  
driving Machine Tools,  
Cranes, Elevators,  
Pumps, Presses and  
other machinery.*  
Complete Power and  
Light Plants Installed.

## Stow Flexible Shaft Co., Limited,

6th, Callowhill & Biddle Sts.  
PHILA., PA.,

Manufacturers of

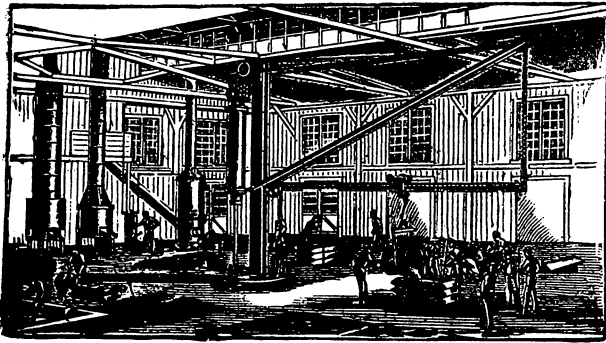
**P**ORTABLE DRILLING,  
TAPPING, REAMING,  
and BORING MACHINES  
Also, Tools for Emery Wheel  
Grinding, Metal and Wood Pol-  
ishing, Cattle Brushing and  
Clipping, &c.

Gen'l European  
Agents,  
**Bolting & Lowe,**  
2 Lawrence  
Pountney Hill,  
LONDON, ENG.



# PUT UP (CRANES) OR SHUT UP (SHOP).

That day has gone by when you can hope to do a profitable business and lug stuff around by hand or with slow moving cranes. You surely must have noticed that the best concerns all over the land are putting in the Simple, Cheap and Rapid Ridgway Steam Hydraulic System of Cranes. The most perfect Hydraulic System, yet requiring neither pumps nor accumulator. That costs nothing to run it. That does the work **INSTANTLY**. Well, when you come to compete with these concerns they will beat you out of your boots! People who put in these cranes are simply amazed at the saving they make. They expected some saving, of course, but they had no idea a crane could be so magnificent—they had been used to the usual sort of cranes. We are always ready to furnish cranes and take for our pay one-half what they save in wages in a specified time.



Here is the sort of letters we are constantly getting:

CRAIG RIDGWAY & SON, Coatesville, Pa.

DEAR SIR:

\*\*\*\*\* Your cranes have worked Splendid and have given us entire satisfaction. We would not trade them for anything we have ever seen.

BUFFALO CAST IRON PIPE CO.,

HENRY HENDERSON, Supt.

BUFFALO, N. Y., August 28, 1894.

Many styles and modications to suit every kind of place, to do work Quickly and Cheaply. Also Elevators and Stock Hoists worked by Steam-Hydraulic.

Our new Circular is worth having.

## CRAIG RIDGWAY & SON, - Coatesville, Pa.

**SELL THE BEST.**



**THE "SURE GRIP" Steel Tackle Block**

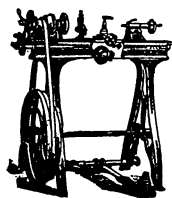
is taking the place of all other hoisting blocks.

Send for catalogue and discount.

Fulton Iron & Engine Works  
28 Brush St., Detroit, Mich.  
ESTABLISHED 1852.

—OR—

Rice Lewis & Son, Ltd.,  
TORONTO, CAN.



### Foot & Hand Power Machinery,

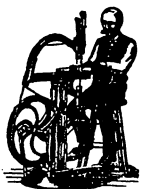
Screw Cutting Lathes, Wood Turning Lathes, Scroll Saws, Circular Saws, Moulders, Mortisars, Etc.

Strictly High Grade.

Catalogue Free.

**SENECA FALLS MFG. CO.,**  
255 Water St., Seneca Falls, N. Y., U. S. A.

London Agency, MESSRS. CHAS. CHURCHILL & Co., 21 Cross St., Finsbury, London, E. C., England.



# LATHES.

ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.



**TRIPLEX**  
Spur Gear.  
**DUPLEX**  
Convertible.  
**DIRECT**  
Differential.

The Yale & Towne Mfg. Co.  
STAMFORD, CONN.

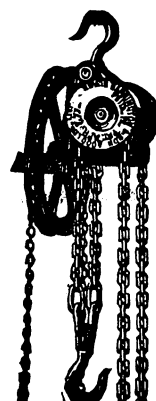
New York, 84-86 Chambers St.  
Chicago, 152-154 Wabash Ave.  
Philadelphia, 1120 Market St.  
Boston, 224 Franklin St.  
Pittsburgh, Times Bldg.  
San Francisco, Mills Bldg.

**LATHES,** PLANERS, SHAPERS, DRILLS, TOOLS

Workmanship, Material, &c., Best. Prices Low.

**SEBASTIAN LATHE CO.,** 113 & 115 Culvert St., CINCINNATI, O.

MODERN DESIGNS. CAT. FREE.



Machine Tools.

EDWIN HARRINGTON,  
SON & CO., Inc.,  
1508 Penna Ave., Phila., Pa.

**LATHES.**

★  
**PLANERS.**

★  
**DRILLS.**

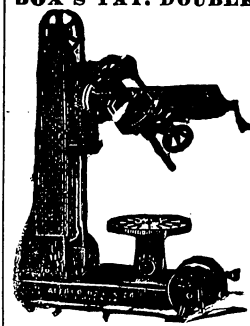
★  
**HOISTS.**

Traveling Cranes.

**Alfred Box & Co.,**  
Front, Poplar and Canal Sts., Philadelphia.  
SOLE MANUFACTURERS OF

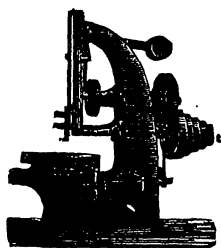
**BOX'S PAT. DOUBLE SCREW HOISTS**

25,000 supplied in the United States exclusive of foreign trade; a record that tells its own story; a record of solid, substantial growth; extensive new works necessary to keep up with orders in our specialties; ample room now to build the heaviest class of Traveling and Jib Cranes of all sizes, Overhead Railways, Trolleys, Special Hoisting Gear for home-made Cranes; also our Patent Radial Drills and Gang Drills, as used by bridge builders. Estimates furnished with photos. Correspondence solicited or visit our works.



**The Metallurgy of Lead and the Desilverization of Base Bullion.** By H. O. HOFMAN, E.M. Ph.D., Associate Professor of Mining and Metallurgy Massachusetts Institute of Technology. This work will be found indispensable to every one connected with the lead industry or with general metallurgy. Cloth.....\$5.00

For sale by David Williams, 96-102 Reade St., N. Y.



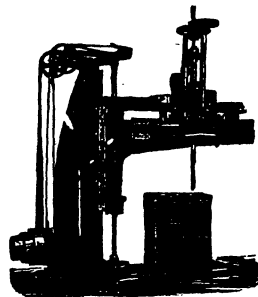
*William Sellers & Co., Incorp.*

PHILADELPHIA, PA.,

—MANUFACTURERS OF—

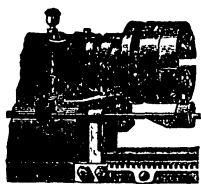
Improved Machine Tools for Working Iron and Steel,  
High Speed Power Traveling and Swing Cranes,  
Injectors, Locomotive Turn Tables, Shafting, &c., &c.  
Testing Machines, under patents of A. H. Emery.

Prices, Descriptive Matter, &c., Furnished on Application.



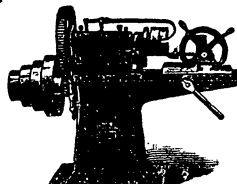
**ADAMS**

**Automatic Bolt-Threading & Nut Tapping Machine.**



Made in all Sizes to Cut from 1-4 in. to 6 in.

The simplest and most durable machine in existence. The threading head is made entirely of steel. No links, levers, springs, caps, cases, blocks or die rings in or about the head. Separate Heads and Dies Furnished. Write for descriptive circular and price-list to



**DETRICK & HARVEY MACHINE CO.,**

Engineers and Machinists,

BALTIMORE, MD.

MANUFACTURERS OF

**THE OPEN SIDE IRON PLANER.**

**MORSE,**

**WILLIAMS**

**& CO.**

Morse Elevator Works.

MANUFACTURERS AND BUILDERS OF

**ELECTRIC, HYDRAULIC, BELT and HAND  
POWER PASSENGER and FREIGHT**

**ELEVATORS.**

1105 Frankford Ave., Philadelphia. 108 Liberty St., New York.  
1116 E. St., N. W., Washington, D. C. 33 Lincoln St., Boston.  
425 Spruce St., Scranton, Pa. 82 Church St., New Haven.  
Omaha Building, Chicago, Ill.

**FAIRMOUNT MACHINE CO.,**

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Sts., Philadelphia, Pa.

Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

Rope Transmission; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.

**Penn Elevator Engineering Co., ELEVATORS**

WORKS:  
BLOOMSBURG, PA.

PHILADELPHIA

OFFICE:

516 COMMERCE ST.

MANUFACTURERS  
AND BUILDERS

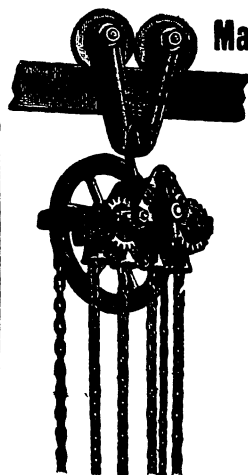
Hydraulic and Direct Electric Passenger and Freight Elevators.  
Steam, Belt and Hand Power Elevators of every description,  
With Automatic Doors or Gates.

**Catalogue  
of Books,**

Including the principal works on Metallurgy,  
Mineralogy, Engineering, Electricity, Mechanics  
&c., sent free to any address by

DAVID WILLIAMS, Publisher,

96-102 Reade Street, NEW YORK.



**Maris & Beekley.**  
PHILA., PA.

MANUFACTURERS OF

**CRANES,**

Power Bridge  
Cranes, Hand  
Bridge Cranes,  
Jib Cranes.

Portable Hoist.  
Holds load at any  
point.

Overhead Track,  
Trolleys,  
Switches.



**SPEIDEL & ROEPER,**  
807 & 809 Cherry Street,  
READING, PA.

Manufacturers of Spidel's Patent  
Economic Safety Hoists,  
500 to 30,000 lbs. capacity.

Have been awarded the "John Scott  
Medal and Premium" by the Franklin  
Institute of the City of Philadelphia,  
also Medal and Diploma by the  
World's Columbian Exposition,  
at Chicago, for Highest Efficiency,  
Simplicity and Durability.

With our hoist one man can lift two  
or three times as fast as with any other  
hoist, it has two speeds, and is guaranteed  
to give satisfaction. Traveling  
and Swing Cranes up to 30,000  
lbs. capacity and 50 ft. span. Over-  
head Tramway. Trolleys,  
Switches and Special Hoisting  
Machinery.

Self-contained Elevators and Dumb-  
waiters. Illustrated catalogue and  
prices on application.



**Moore Mfg. & Fdry. Co.,**

Milwaukee, Wis., U. S. A.

Manufacturers of

Moore's Anti-Friction

Differential

Chain

Pulley

Block.

A New Movement!  
A Perpetual Com-  
pound Lever!

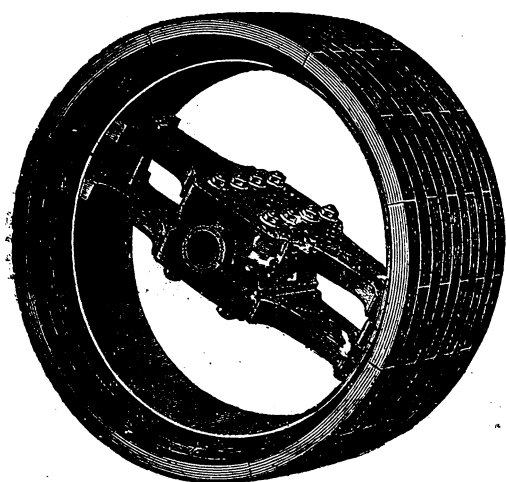
Powerful, Simple and  
Durable!

One Man Can Lift to  
the Full Capacity of the  
Block.

Self-Sustaining at Any  
Point.

The Block Always  
Hangs Plumb.

Send for descriptive price list  
mentioning this paper.



# STRICTLY HIGH GRADE. INDEPENDENCE WOOD SPLIT PULLEY,

With Patent Bushing System.

THE ORIGINAL AND BEST. OVER ONE MILLION IN USE.

Sales Agencies in all the Leading Cities of the World.

SEND FOR CATALOGUE AND PRICE-LIST.

**DODGE MANUFACTURING CO.,** MISHAWAKA, IND.

NEW YORK BRANCH and Distributing Depot, 43 and 45 Dey Street.

CHICAGO BRANCH, 166-174 S. Clinton St.

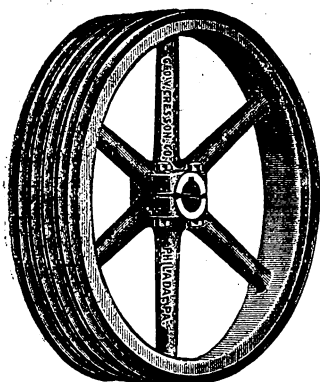
BOSTON BRANCH, 126 Pearl St., Opened June 1st.

LARGE STOCKS at BRANCH HOUSES and at WORKS.

**GEO. V. CRESSON CO.,**

18th STREET AND ALLEGHENY AVE.

PHILADELPHIA, PA.



## ROPE WHEELS,

All Diameters and Number of Grooves, for Manilla, Hemp, Cotton, or Leather Ropes.

## A POINTER



To **SAVE** you **FREIGHT**. We keep in stock everything in the grindstone line at our branch yards, Chicago, Ill., Boston, Mass., and 283 Front Street, New York.

Send for Catalogue D.

**The Cleveland Stone Co.,**

CLEVELAND, OHIO.

**The Practical Catechism.** A collection of questions on technical subjects, by manufacturers and others, and of answers thereto. By ROBERT GRIMSHAW, M.E., Ph.D. Treating of Miscellaneous engineering questions, and touching upon physical science, chemistry, etc. GENERAL TOPICS: Properties of Air; Alloys; Beams; Belts; Bricks; Building; Building Stones; Calculations; Cements; Chemical Processes; Coloring Metallic Objects; Combustion; Disinfectants; Fastenings; Fluxes; Foods; Foundry Practice; Fuels; Gas; Gear Wheels; Gravity; Hardening; Tempering and Annealing; Heating; Hydraulics; Iron and Steel; Limes, Mortars and Cements; Locomotives; Lubrications; Mechanical Processes; Metals in General; Millwrighting; Paints, Oils and Varnishes; Plants; Power; Railways; Ropes; Saws; Shafting; Solders; Strength of Materials; Sugars; Temperatures; Timber and Trees; Ventilation; Waters; Weights; Wines; Work Miscellaneous. 207 pages, cloth, .....\$1.25

For sale by David Williams, 96-102 Reade St., N. Y.

(ESTABLISHED 1854.)  
**A. & F. BROWN,**

Engineers, Founders and Machinists.

**SHAFTING,  
PULLEYS, HANGERS, ETC.**

**FRICITION CLUTCHES.**

Estimates and Plans furnished for transmitting power by  
**HORIZONTAL AND VERTICAL SHAFTING**  
Also for erecting same.

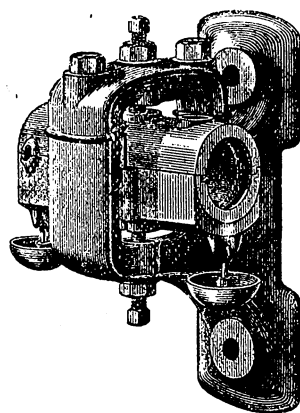
**STEAM SIRENS**

—FOR—

Lighthouse, Steamship, Factory and Fire Signals.

SEND FOR CATALOGUE.

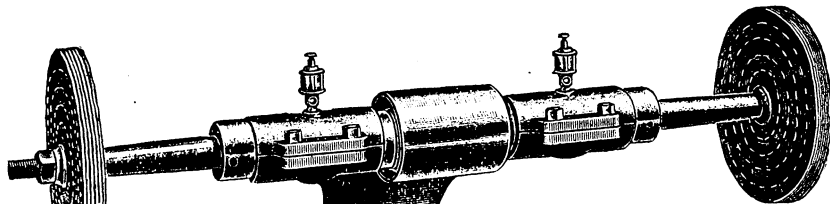
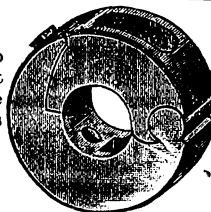
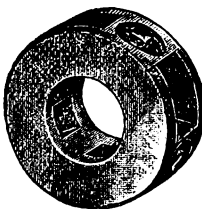
17 DEY ST., - - - NEW YORK.



## A SPLIT COLLAR

that may be put upon a shaft in a space equal to its length, and that has no projecting Bolts or Set Screw Heads is the correct thing. That is the kind our "GIANT" is. Price list and discounts on application.

**THE GOUVERNEUR MACHINE CO.,**  
Gouverneur, N. Y.



## No. 5 Overhanging Polishing and Buffing Lathe,

For Bicycle Frames, Chandelier Work, Railings and other pieces of awkward dimensions.

Weight 350 Pounds.

WE manufacture a full line of Polishing and Buffing Machines and Plating Dynamos, and are prepared to estimate on outfits for any class of polished and plated work from start to finish.

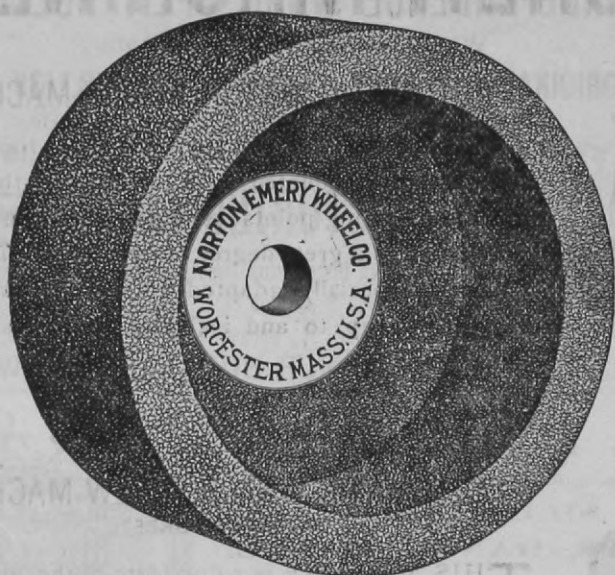
Nickel Plating Outfits a Specialty.

SEND FOR CATALOGUE.

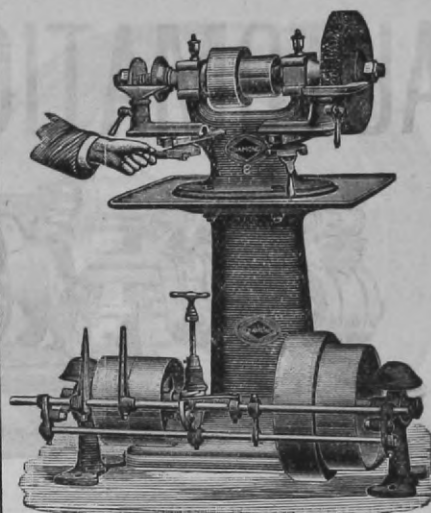
**Cutter, Wood & Stevens,** 131 PEARL STREET  
BOSTON, MASS.



# Norton Emery and Corundum Wheels.



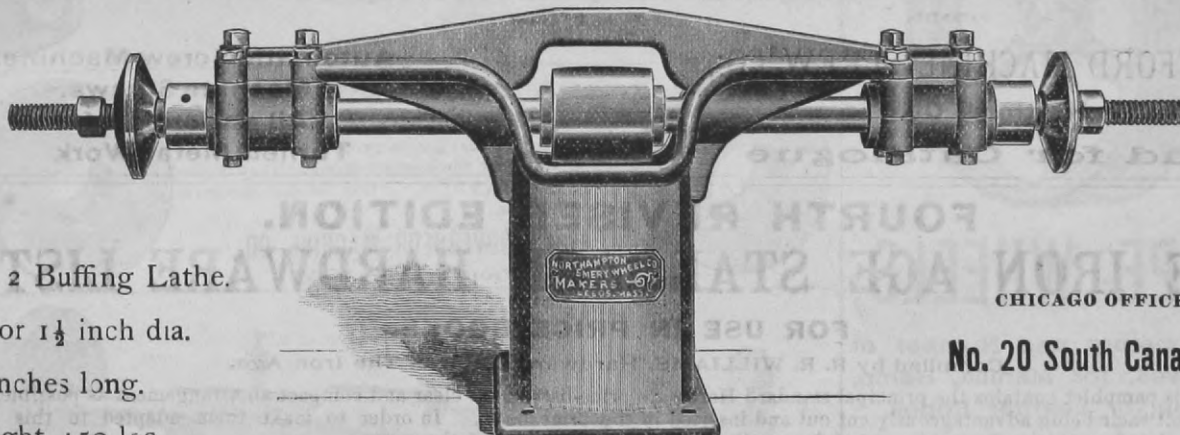
Illustrated Catalogue Free on Application.



**No. 6 Grinding Machine.**  
 $1\frac{1}{4}$  inch Steel Arbor. Carries wheels  
 16 inches diameter.

**Diamond Machine Co.,**  
 Providence, R. I.

## NORTHAMPTON EMERY WHEEL CO. Leeds, Mass.



**No. 2 Buffing Lathe.**

Arbor  $1\frac{1}{2}$  inch dia.

48 inches long.

Weight, 150 lbs.

CHICAGO OFFICE,

**No. 20 South Canal St.**



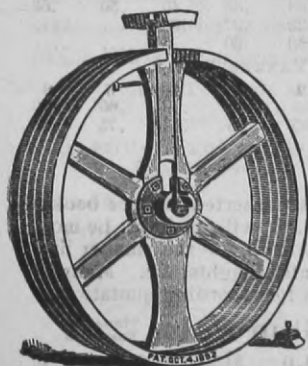
### THE Bennett Emery Wheel Dresser

Does the best work, does it easy, quick and the most for the least money. Manufactured by Bay State Stamping Co., 17 Hermon Street, Worcester, Mass.

Sterling Emery Wheel Company, 174 Fulton St., N. Y.

FACTORIES:

Tiffin, Ohio, and West Sterling, Mass.



### THE Reading Wood Pulley

Is a strictly high grade Pulley, with bored iron hub, which has a perfect grip on shaft and gives universal satisfaction.

Our large stock is at your service.

Write for price-list and discount.

**AGENTS WANTED.**

**READING WOOD PULLEY CO.,**

READING, PA., U. S. A.

### ELEMENTS OF COST.

By Frederick W. Child.

20 PAGES,

Paper, 25 Cents.

5 x 7 $\frac{1}{4}$  inches.

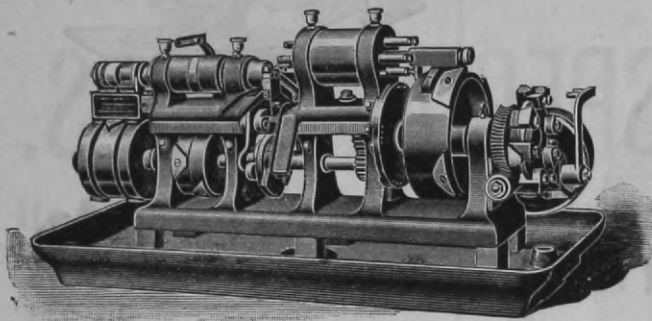


An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry. Sent post-paid on receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York,



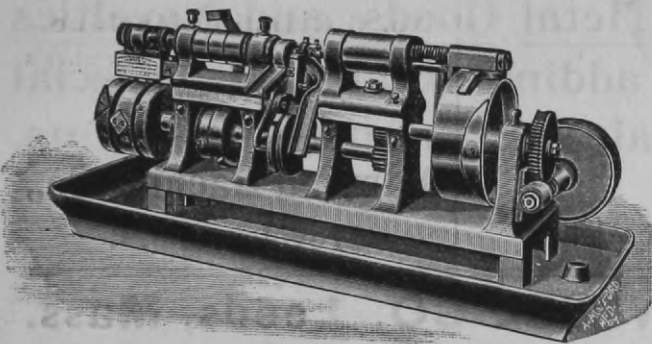
# AUTOMATIC SCREW MACHINERY



PATENTED.

## AUTOMATIC WATCH SCREW MACHINE.

CONSTRUCTED with four horizontal tool holding spindles mounted in a turret, very thoroughly made, all wearing points being hardened and ground, which insures a great degree of accuracy. This machine is especially adapted to close work and will carry stock up to and including 3 16 of an inch in diameter



PATENTED.

## AUTOMATIC WATCH SCREW MACHINE WITHOUT TURRET.

THIS MACHINE is a duplicate of the former excepting that it has but one horizontal spindle and two tools on the cross-slide, and was designed more especially for producing pins, studs and other plain work.

HARTFORD MACHINE SCREW CO.,

Hartford, Ct.

Send for Catalogue

Automatic Screw Machinery.

Machine Screws.

All varieties of  
Turned Metal Work.

## FOURTH REVISED EDITION.

# THE IRON AGE STANDARD HARDWARE LISTS

## FOR USE IN PRICE BOOKS.

Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

### Saucepans and Round Bollers.

Pnts.	Plain	Turned.	Tin'd or En'd.
1	\$0.30	.35	.39
1 1/4	.32	.37	.44
2	.35	.39	.48
3	.42	.47	.56
Quarts.			
2	.50	.56	.63
2 1/4	.53	.59	.68
3	.55	.62	.73
4	.60	.68	.84
5	.65	.75	.96
6	.70	.81	1.11
7	.75	.84	1.21
Gallons.			
2	.85	.96	1.31
2 1/4	1.05	1.18	1.56
3	1.20	1.35	1.70

The success of the effort to give the lists in small space is illustrated in many of the lists, in which a clear and condensed arrangement is secured. For instance, the wrench list occupies but 3 inches by 1/4 inch, while the list of Stove Hollow Ware, in very small space, gives the list prices on a large and important line of goods which often occupy several pages in catalogues. In several lists, such as Strap and T Hinges and Butts, a new arrangement is adopted, which is regarded as presenting these lists in a very convenient as well as condensed form.

As is obvious from the lists herewith reproduced, the shape and size of the different lists varies greatly, the aim being to give each list the smallest and most convenient arrangement possible. None of the lists are, however, more than 3 1/4 x 6 inches in size, very few of them being as large as this and most of them very much smaller. In use it is intended that they shall be trimmed closely before they are inserted in price books,

when they may be attached either by one edge close to the hinge of the book, as will, perhaps, be most convenient with the larger lists, permitting the use of the entire page for memoranda, or the smaller lists may be pasted on the page in connection with the entries in regard to discounts, freights, &c. Many of the lists are so compact in arrangement as when thus inserted to leave ample room for recording quotations.

### Wrenches.

Inches.	6	8	10	12	15	18	21
Black...	\$9.00	\$10.00	\$12.00	\$14.00	\$24.00	\$30.00	\$36.00
Bright..	10.00	11.00	14.00	16.00	26.00	32.00	38.00

and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a Fourth edition is already called for.

EVERY HARDWAREMAN SHOULD HAVE A COPY. Price 25 cts.

### Stove Hollow Ware.

Ground and  
Unground.

POTS, KETTLES, ETC. (CAST IRON.)

No.	6	7	8	9	10	11
Pots.....	\$0.65	.75	.85	1.00	1.25	1.75
Kettles.....	.55	.65	.70	.85	1.00	1.40
T Kettles.....	.75	.80	.90	1.00	1.25	...
Spiders.....	.27	.30	.35	.40	.50	.60
Griddles Round	.22	.25	.27	.30	....	....
" Long..	.40	.50	.60	.75	....	....

SCOTCH AND YANKEE BOWLS.

No.	1	2	3	4	5	6
Scotch Bowls..	\$0.35	.40	.45	.50	.60	.70
Yankee Bowls.	.35	.45	.55	.65	.75	.90

Some merchants use this pamphlet for reference, checking off invoices, etc., as it gives the leading lists in a more convenient form than they can otherwise be obtained. The lists are, however, intended primarily to be cut out

### Glue Pots.

Tinned or  
Enamelled

No. 4/0....	\$4.50	No. 2 .....	\$8.40
3/0.....	5.00	3 .....	10.26
2/0.....	5.50	4 .....	12.42
0 .....	6.00	5 .....	14.58
1 .....	6.75	6 .....	16.94

Sent, postpaid, on receipt of price, by DAVID WILLIAMS, Publisher, 96-102 Reade Street, New York.



# MONEY SAVING SPECIAL TOOLS.

We have enlarged our facilities for producing small tools for special purposes and this department of our business is in charge of an experienced and skillful designer. Manufacturers of Hardware, Metal Goods and Novelties may greatly reduce costs by adding small tools, special dies, &c., to the machinery already in use. Write us, stating your needs.

**THE E. J. MANVILLE MACHINE CO., - WATERBURY, CONN.**

## A Boring and Turning Mill

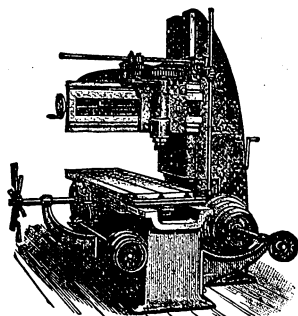
Did you ever notice that a Mill can do more work than a Lathe?

We have a variety of sizes, with regular and special heads.

### BULLARD MACHINE TOOL CO.

E. P. BULLARD, Pres. Bridgeport, Conn.

NEW YORK OFFICE, 145 BROADWAY AND 86 LIBERTY ST.



Vertical Spindle Milling Machine.

**BEAMAN & SMITH,**

**FOR NUMBERING AND LABELING  
Boxes, Drawers and Shelves**  
In Hardware Stores and Factories.

Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade.

**THE TABLET AND TICKET CO., Mfrs.**  
87-89 Franklin St., Chicago. 99 Franklin St., New York.

Do you **REALIZE** that a reduction in the cost of production may mean the difference between **SUCCESS** and **FAILURE** to you? Modern and special tools produce **SATISFACTORY RESULTS** and **PAY DIVIDENDS**.

There are **IDEAS** in our catalogue C.

**SEND FOR IT.**

**PROVIDENCE R. I.**

**WILLSON'S  
PAPER  
LETTERS**

D

FINE . . . DESIGNS FOR  
MACHINE \* AUTOMATIC . .  
WORK . . . MACHINERY.  
The L. E. RHODES CO., . . .  
. . . HARTFORD, CONN.

### SPECIAL

And Automatic Machinery and Tools for reducing cost of manufacturing machines, parts of machines, articles of hardware, &c., designed and built. Tools, models and experimental work. Estimates given. Correspondence solicited.

**IDEAL MACHINE WORKS,**

P. O. Box 655 Hartford, Conn.



**J. Popping's**  
Patent Machine  
and Tool Wks.

MANUFACTURERS OF  
solid Iron Shoulder Rabbet Planes, etc., etc., and  
Hofstatter's Patent Hair Picking Machine.  
N. E. Cor. 58th St. and 11th Ave., N. Y.



**The Scattergood**  
Time Record and  
Pay Roll Book.  
(Pat. Oct. 13, 1891.)  
Address for Circular to  
**THE SCATTERGOOD CO.,**  
Laurel St., Philadelphia.

**PATTERN LETTERS**  
For Iron and Brass Castings.  
Various Sizes and Styles.  
Heber Wells, 157 William St., N.Y.

## NEW AND SECOND-HAND MACHINERY IN STOCK.

**ENGINE LATHES.**  
10 in. x 6 ft. Improved.  
13 in. x 6 ft. Blaisdell.  
14 in. x 6 ft. Fitchburg.  
14 in. x 6 ft. Flather Taper.  
15 in. x 8 ft. Improved.  
15 in. x 6 ft. Prentice.  
16 in. x 6 ft. Pond.  
16 in. x 6 ft. Ames.  
16 in. x 8 ft. Fitchburg.  
17 in. x 6 ft. Prentice.  
18 in. x 8 ft. Flather.  
20 in. x 10 ft. Putnam.  
20 in. x 12 ft. Prentiss Taper.  
20 in. x 12 ft. Putnam.  
22 in. x 14 ft. Putnam.  
24 in. x 12 ft. Fitchburg.  
24 in. x 16 ft. Fay & Scott.  
30 in. x 16 ft. Perkins.  
34 in. x 8 ft. Putnam.  
35 in. x 15 ft. Hewes & Phil.  
36 in. x 18 ft. Improved.  
48 in. x 20 ft. Fitchburg.

**BRASS LATHES.**  
15 in. x 5 ft. Turret Fox.  
18 in. x 6 ft. Cabinet Fox.

**SCREW MACHINES.**  
Nos. 1, 2 and 3 Improved  
with Wire Feeds.

**MILLING MACHS.**  
"Universal," Improved,  
"Tool Room Size,"  
"Universal," Improved,  
"Largest Size," Plain, with  
Standard Sizes, Plain, with  
Auto. Feeds and Arms.  
Brown & Sharpe No. 6  
Plain.  
Lincoln Pattern, Plain.

**UPRIGHT and HOR-  
ZONTAL MILLS.**  
No. 2 Hor. Boring and Drill-  
ing Machine, "Bements,"  
Cylinder Borer, Bements.  
B. & S. Turret Borer, 36 in.  
Boring and Turning Mill.  
38 in. Two Heads.

**J. J. McCabe,**  
14 Dey Street, - New York,  
Successor to E. P. BULLARD'S N. Y. Machinery  
Warerooms.

## New and Second-Hand Machinery.

1 Schirmer Wood Carver. Nearly new.  
1 28½ in. Lefell Water Wheel. Second-hand.  
2 35 in.  
1 Eureka Smutter. Nearly new.  
1 No 8 Diamond Water Grinder. New.  
1 No. 2  
1 H. B. Smith Blind Slat Tenoner. Second-hand.  
1 20 in. Clement Pony Planer. Second-hand.  
1 24 in. Buzz  
1 30 in. Gauge Lathe.  
1 Two Spindle Graham Shaper.  
2 13 in. x 7 ft. Sebastian Lathe. New.  
2 15 in. x 7 ft.  
10 Wood Frame Saw Tables. Second-hand.  
1 Knapp Dovetailing Machine. Second-hand.  
1 Rowley & Hermance Three Sided Molder.  
Second-hand.  
1 Clement Rod and Dowel Machine. Second-  
hand.  
1 Clement Dado Machine. Second-hand.  
1 H. B. Smith Jointed Sander. Second-hand.  
1 Clement Vertical Boring Machine. Second-  
hand.  
1 Clement Boring and Bit Mortising Machine.  
Second-hand.  
1 Large Gas Furnace. Second-hand.  
1 35 in. Exhaust Fan. Second-hand.  
1 72 in. Fan Blower, Sturtevant. Second-hand.  
1 Clement Chair Round Machine Second-hand.  
1 24 in. Pony Planer. Second-hand.

This list will be changed each week.

**W. P. DAVIS**

Rochester, N. Y.

## 50 H. P. Vertical Boiler.

Second-hand, in use three  
weeks.

Will name price complete.  
We had two of them, but  
one remains.

**THE SCRANTON SUPPLY & MACHINERY CO.,**  
SCRANTON, PA.

## Second-hand Iron Planers and Engines For Sale.

One David Pond Iron Planer, 32 in. x 32 in. x 10 ft.  
Double Head.  
One Lucius Pond Iron Planer, 33 in. x 33 in. x 10 ft.  
One Wood, Light & Co. Iron Planer, 27 in. x 27 in. x 8 ft.  
One W. P. Davis Iron Planer, 24 in. x 24 in. x 6 ft.  
One Bement Planer, 22 in. x 22 in. x 8½ ft.  
One Bement Planer, 22 in. x 22 in. x 5 ft.  
One Wm. Bishop Iron Planer, 24 in. x 24 in. x 6 ft.  
Two Bement Planers, 20 in. x 20 in. x 4 ft.  
One Belden Crank Planer, 16 in. x 16 in. x 24 in.  
One Pratt & Whitney Iron Planer, 15 in. x 15 in. x 3 ft.  
One Hand Planer, 8 in. x 8 in. x 1½ in.

**ENGINES.**  
One 8½ in. x 10 in. Armington & Sims Automatic Hor-  
zontal Engine.  
One 14½ in. x 15 in. Armington & Sims' Automatic  
Horizontal Engine.

**L. F. SEYFERT'S SONS,**  
437-441 N. 3d St., Philadelphia, Pa.

## FOR SALE.

3 Steam Shovels.  
7 Locomotives, Standard and Narrow.  
27 Cars, 2 and 3 feet gauge.  
11 Hoisting Engines.  
27 Steam and Centrifugal Pumps.  
5 Iron Planers.  
Engines and Boilers.

**THOMAS CARLIN'S SONS,**  
Allegheny, Pa.

## SECOND HAND MACHINERY.

**ENGINE LATHES.**  
9 in. x 8 ft. Young Foot  
Power.  
14 in. x 6 ft. Prentice Bros.  
Rise and Fall.  
15 in. x 6 ft. Prentice Bros.  
Rise and Fall and Taper.  
1 14 in. x 6 and 8 ft. Fitch-  
burg. Rise and Fall.  
14 in. x 6 ft. Putnam Com-  
pound Rest and P. C.  
Feed.  
24 in. x 36 in. x 10 ft.  
New Haven. Plain Gb.  
24 in. x 36 in. x 13 ft.  
Gould. Plain Gb.  
87 in. x 10 ft. Fifeild.  
Compound Rest.  
74 in. x 12 ft. Welsh.  
Plain Gb.  
84 in. x 20 ft. Niles Triple  
Geared. Compound  
Rest.

**PLANERS.**  
16 in. x 16 in. x 12 in.  
Belden (Crank).  
16 in. x 16 in. x 3 ft. Pratt  
& Whitney.  
18 in. x 18 in. x 4 ft. Put-  
nam Planer.  
22 in. x 20 in. x 6 ft. Put-  
nam Planer.  
25 in. x 25 in. x 5½ ft.  
Buehner (Screw).  
24 in. x 24 in. x 6 ft. Pease.  
24 in. x 24 in. x 6 ft. Whit-  
comb.  
36 in. x 34 in. x 16½ ft.  
L. W. Pond.  
61 in. x 45 in. x 15½ ft.  
New Haven.

**SHAPERS.**  
6 in. Crank. Boynton &  
Plummer.  
11 in. Crank. Bement.  
12 in. Friction. Hendey.  
13½ in. Crank. Trav. Head.  
Fitchburg.  
15 in. Friction. Prentiss.

Send for New List. Over 600 Machines in  
Stock.

**PRENTISS TOOL & SUPPLY CO.,**  
115 Liberty Street, New York. 59 South Canal Street,  
Chicago, Ill.

## SPOT-CASH

**WILL BUY**  
16 in. x 6 ft. Engine Lathe. Good order.  
18 in. x 8 ft. " " " "  
21 in. x 10 ft. " " " "  
16 in., 20 in., 22 in. and 26 in. Shapers.  
At extremely low prices. Write  
**J. STEPTOE & CO.,** - Cincinnati, O.

## FOR SALE.

The following second-hand tools in good order:  
34 x 8½ Lathe. Putnam Machine Co.  
1 in. double head Driving Wheel Lathe.  
26 in. Chucking Machine. P. & W.  
Milling Machine, double column, double head.  
P. & W. Grant Pattern.  
Two 3-Spindle Drills, P. & W.

**BULLARD MACHINE TOOL CO.,**  
E. P. BULLARD, Pres., Bridgeport, Conn.  
N. Y. Office, 145 Broadway and 86 Liberty St.

## FOR SALE.

A large Knowles Steam Pump, 30 in. Steam  
Cylinder, 18 in. Water Cylinder, 12 in. discharge.  
**F. McSWEGAN & SONS,**  
Dover St. and Franklin Square, N. Y.

FOR

# MACHINERY

ADDRESS US.

**Pennsylvania Mch. Co., Ltd,**  
PHILADELPHIA, PA.

## MACHINERY BARGAINS.

10 in. Post Drill.  
10 in. Post Drill, Auto.  
Feed to Table for Butt  
Drilling.  
1, 2 and 3 Spindle Sensitive,  
with and without  
Power Feed.  
2, 3 and 4 Spindle Gang  
Drills.  
20, 24, 28, 30 and 44 in.  
Drills.  
60 in. Swing Post Drill.  
5 ft. Arm Radial Drill.  
12 in. Stroke, 16 in. x 16  
in. Crank Planer.  
16 in. x 4 ft. Planer.  
24 " 4, 5 and 6 ft. Planer.  
28 " 5 and 8  
30 " 5, 8 and 10 " "  
60 " 20 " "  
72 " 25 " "  
9, 12, 16, 24 and 26 in.  
Stroke Shaper.  
10 in. Stroke Slotter.  
Hyd. Riveting Machine.  
Crane, Both A1.  
Punch and Shear.  
Plate Planer.  
11 in. x 5 ft. Eng. Lathe.  
14 " 6 " "  
15 " 8 and 9 ft. Engine  
Lathe.  
16 in. x 5, 6, 7 and 10 ft.  
Engine Lathe.  
18 in. x 6, 7 and 8 ft. Eng.  
Lathe.  
20 in. x 6, 6, 7, 8 and 10 ft.  
Engine Lathe.  
21 in. x 10 and 13½ ft.  
Engine Lathe.  
24 in. x 10 ft. Eng. Lathe.  
25 in. x 16 and 24 ft. Eng.  
Lathe.  
26 in. x 10½ ft. Eng. Lathe.  
32 " 16 " "  
35 " 13 " "  
52 " 35 " "  
57 in. Double Head  
Driving Wheel  
Lathe.  
Bement Car Axle Lathe.  
¼ and 2 in. Bolt Cutter,  
Schenk's  
7 Spd' Nut Tapper, Dunel.  
2 Spd' Profiler, No. 1, P. & W.  
No. 1, 2 and 2½ Screw  
Machs., P. & W.  
No. 1 Lincoln Pattern Mil-  
ler.  
Hand Millers, Screw Slot-  
ters, Mill and Cutter  
Grinders.

Lot of Miscellaneous Machinery, Engines, etc. Send  
for Latest List.

**GEO. PLACE MACHINE CO.,**  
Offices: 145 Broadway and 86 Liberty St.  
Warehouse: 511 and 513 West 13th Street.  
NEW YORK.

## For Sale Cheap.

## Special lot of NEW ENGINE LATHES

13 in. x 5 ft.  
15 in. x 6 ft.  
27 in. x 12 ft.  
32 in. x 12 ft.  
17 in. x any length bed.  
27 in. x any length bed.  
30 in. x any length bed.  
32 in. x any length bed.

ADDRESS

**Draper Machine Tool Co..**

Successors to

**LATHE & MORSE TOOL CO.,**

140 Gold Street

WORCESTER, MASS.

## Machine Tools, Special Prices;

Planer 20" x 27" x Planes 7'. Good. .... \$825.  
" 24" x 24" x " 6' New, hvy, mod'n 390.  
Shaper 24". New, heavy and accurate. .... 295.  
" 15". Used only few weeks. .... 185.  
Drill 38". Back Geared, heavy, good as new. 275.  
" 40". " " " " " " " " 300.  
" 26". " " " " " " " " 135.  
" Dallett No. 1 Portable, good as new. .... 80.  
" 20". New, latest pattern. .... 50.  
" 18". Used 6 months, fully refitted. .... 38.  
6 Wall Drills, 36" swing, Job Lot. Each. .... 25.  
Forging Drop, 100 lb. Hammer, New Design 160.  
Lathe 32" x 12". Practically new, heavy ... 400.  
" 24" x 12". " " " " " " " " 350.  
" 20" x 11½". " " " " " " " " 275.  
" 18" x 8". Latest style, with tools, &c. 245.  
" 16" x 8". Fitchburg, extra good order. 125.  
Punch Press, New, Fer'cute style, wt. 3000 lb. 225.  
" & Shear comb'd, good, 3600 " 200.  
" Stiles & Parker Design, 1500 lbs. 145.  
" 1250 " 125.

**AMERICAN TOOL WORKS, Cleveland, O.**

## New and Second-hand MACHINE TOOLS.

**ENGINE LATHES.**  
14 in. x 6 ft. Lodge & Davis.  
16 in. x 6 ft. Lodge & Davis.  
19 in. x 6 ft. Pratt & Whitney.  
21 in. x 11 ft. Lodge & Davis.  
24 in. x 12 ft. Special  
heavy pattern.  
24 in. x 12 ft. Standard  
24 in. x 16 ft. New Haven.  
28 in. x 17½ ft. New Haven.  
24 in. x 38 ft. Shafting Lathe  
1 12 in. x 4 ft. Manhattan Co.  
**TURRET LATHES.**  
8 Each 12 in. & 15 in. Lever  
and screw movement  
to turret.  
8 22 in. x 8 ft. Chucking.  
**PLANERS.**  
24 in. x 24 in. x 8 ft. Lodge & D  
24 in. x 24 in. x 8½ ft. Putnam.  
**SHAPERS.**  
15 in. Crank.  
20 in. Geared.  
26 in. Geared.  
**DRILL PRESSES.**  
20 in. Lever Drill.  
24 in. B.G.P.F. Drill.  
24 in. Post Drill.  
52 in. Comb. Radial.  
80 in. Comb. Radial.  
120 in. Radial.  
1 Brest Drill.  
**MILLING MACHS.**  
No. 2 and No. 4 Garvin.  
**MISCELLANEOUS.**  
2 No. 1 Garvin Tapping  
Machines.  
1 No. 2 Garvin Tapping  
Machine.  
1 Open Die Header, for  
heading bicycle spokes.  
1 Garvin screw slotter.  
Pulley Machinery.  
Brass Working Machinery.  
**THE LODGE & SHIPLEY M. T. CO.,** Cincinnati, Ohio.

## Second-hand Tools.

### LATHES.

- 1 13 x 6 Pratt & Whitney Lathe.
- 1 14 x 5 Wheeler Lathe.
- 1 15 x 6 Porter Lathe.
- 1 16 x 6 Bogart Lathe.
- 1 17 x 12 Engine Lathe.
- 1 18 x 6 Putnam Lathe.
- 1 18 x 8 New Haven Lathe.
- 1 20 x 8 Porter Lathe.
- 1 20 x 10 Porter Lathe.
- 1 20 x 12 Blaisdell Lathe.
- 1 21 x 8 Lodge & Davis Lathe.
- 1 24 x 12 Lodge & Davis Lathe.
- 1 30 x 23 Sellers Lathe.

### PLANERS.

- 1 22 x 23 x 4 Whitcomb Planer.
- 1 24 x 24 x 7 New Haven Planer.
- 1 24 x 24 x 8 Lodge & Davis Planer.
- 1 36 x 30 x 8 Hollingshead Planer.
- 1 36 x 36 x 8 Cove Planer.
- 1 40 x 36 x 10 Steptoe Planer.

### DRILLS.

- 1 3 ft. Batman Radial Drill.
- 1 20 in. Lodge & Davis Sliding Head Drill.

### SHAPERS.

- 1 15 in. Juengst Shaper.
- 1 18 in. Shaper.
- 1 20 in. Lodge & Davis Crank Shaper.

### MISCELLANEOUS.

- 1 18 x 6 Automatic Turret Lathe.
- 1 15 x 6 Fox Monitor Lathe.
- 1 80 lb. Long & Allstatter Helve Hammer.
- 1 1/2 in. Long & Allstatter Punch and Shear.
- 1 Buffalo Forge.
- 1 B. G. Plain Milling Machine.
- 1 No. 3 Garvin Miller.

## The Lodge & Davis

MACHINE TOOL CO.,

CINCINNATI, O., U. S. A.

### SECOND-HAND MACHINERY.

- 1 Iron Planer 60 in. x 60 in. x 20 ft., 2 heads on Cross Rail.
- 1 Iron Planer 40 in. x 36 in. x 12 ft. 1 30 in. x 30 in. x 8 ft.
- 1 Iron Planer, D. W. Pond, 26 in. x 26 in. x 8 ft.
- 1 Engine Lathe 60 in. x 18 1/2 in. New. Bargain.
- 1 Engine Lathe 24 ft. bed, 64 in. swing, D. W. Pond make, A1.
- 1 Engine Lathe 48 in. x 16 ft., raised to 60 in., Putnam make.
- 1 Engine Lathe 34 in. x 8 ft. 1 30 in. x 14 ft., Putnam.
- 1 Engine Lathe 26 in. x 10 ft., D. W. Pond make.
- 1 Engine Lathe 20 in. x 12 ft., New Haven. 1 18 in. x 8 ft., New Haven.
- 1 Drilling Machine 40 in., B. G. S. F. 1 36 in., B. G. S. F., both New Haven.
- 1 5 ton Foundry Crane, A1.
- 1 10 ton Foundry Crane, A1.
- 1 8 in. x 12 in. Hoisting Engine.
- 1 14 in. x 32 in. Watts & Campbell Engine.
- 1 14 in. x 36 in. Watts & Campbell Engine.

All kinds of Iron and Wood Working Machinery.  
Lists sent. NEW YORK MACHINERY DEPOT,  
Office 178 Broadway, N. Y.

## FOR SALE.

### SECOND-HAND.

- ENGINES, Horizontal and Vertical. All types and sizes up to 2000 H. P.
- BOILERS, Vertical and Horizontal, and 3 Batteries of "Heine" water tube.
- MILLS, 3 high, 12 in., 20 in., 22 in., 30 in. and 36 in. 1 Reversing 32 in. Blooming Mill complete.
- STEAM HAMMERS. Various sizes up to 10 ton.
- SHEARS for Bars, Rails, Blooms and Plates.
- SQUEEZERS, ROLL LATHES, CRANES, GRINDING PANS, MACHINE SHOP TOOLS, &c.
- LOCOMOTIVES. Fine condition, various sizes and gauges.

"If you don't see what you want, ask for it" of

**B. M. EVERSON,**

301 Smithfield St., Pittsburgh, Pa.

## SECOND-HAND MACHINERY FOR SALE.

Planers, Drills and Lathes, good as new, for cash.

**DIETZ, SCHUMACHER & CO.,**

Cincinnati, O.

### WANTED.

To furnish reasonable estimates on specialties in light metal work.

**CLARK & COWLES,** Plainville, Conn.  
Manufacturers of Clock Trimmings, Rivets, Springs, &c.

## Punches and Shears.

- 1 Upright Punch, 1 in. hole in 1 in. plate.
- 1 Lever Punch, with carriage, 1/2 in. x 5/8 in.
- 1 Multiple Punch, very fine.
- 1 Heavy Punch and Shear, combined.
- 1 Medium Punch and Shear, combined.
- 1 Punch or Shear, interchangeable.
- 1 Lever Plate Shear, cuts 1 in. plate.
- 1 Lever Plate Shear, cuts 5/8 in. plate.
- 1 Guillotine Bar Iron Shear.
- 1 Rotary Shear. Pusey & Jones.
- 1 Alligator Shear. 28 in. Knives.

Send for new list and prices.

**THOS. P. CONARD,**

206 Walnut Place, Philadelphia.

## FOR SALE.

### SECOND-HAND.

- CORLISS ENGINES, 36 in. dia. and under.
- PUMPS of all kinds and sizes.
- DYNAMOS, 50 to 500 light capacity.
- BOILERS, (Stationary), 4-150 H. P.
- LOCOMOTIVE BOILERS, 20-250 H. P.
- AIR COMPRESSORS. (6 Sizes.)
- ROCK DRILLS, 1 1/2 in., 5 in. dia.
- ICE MACHINES, 2 of 15 tons each.
- HOISTING AND DREDGING ENGINES, 10-500 H. P.
- TANKS, Round, Square, Closed and Open.

Write for what you need to

**MARVIN BRIGGS,** 12 Broadway, N. Y.

**DOUBLE CORLISS CONDENSING ENGINE,** 600 H. P., One 15 inch by 42 inch Corliss Engine, 125 H. P. Double Automatic Engine, 350 H. P. 2 100 H. P. Phoenix Automatic Compound Engines, 45 and 5 H. P., Westinghouse Engine, one 80 H. P. Beck Engine, one 7 x 7 Southwark Automatic Engine, one 4 H. P. Otto Gas Engine, 100, 200, 300 and 500 H. P. Feed Water Heaters, 30 to 100 H. P. Return Tubulars, 70 H. P. Locomotives, 60 H. P. Vertical Boilers, good for 100 pounds.

**FRANK TOOMEY,** Office 131 N. 3d St. Ware houses-974 to 980 Breach Street, 159 to 161 Canal Street, Philadelphia.

### SOME BARGAINS HERE.

- 1 Hendey Shaper, 15 in. stroke, imp. vise.
- 1 14 x 8 Screw Cutting Engine Lathe. New.
- Pattern Makers' Speed Lathe. 7 ft. Bed, \$40. New.
- 2 1/2 Hendey Cutting-off Machine. New.
- 44 in. C. & D. Resaw. Fine condition.
- Radial Drill, 5 1/2 ft. arm.
- Axle Cutting-off Machine, Double Head, cut 9 1/2 dia.
- Quantity 2d hand Dodge Pulleys. Cheap.
- Safety Construction Company's combined Trap and Pump.

And other machinery, new and second hand. Write for prices. Machinery Supply Company, 89, 41 and 43 Central Ave., Rochester, N. Y.

## A LARGE ADDITION TO OUR STOCK OF CORLISS ENGINES.

Also HIGH SPEED, Etc.

—SEND FOR CATALOGUE.—

Corliss-26 x 48, 23 x 36, 30 x 72, 10 x 20. Several large sizes guaranteed, viz.: 18 x 48, 23 x 48, 28 x 48, 30 x 48, 26 x 60. Many other sizes on hand. Porter-Allen 11 x 16 and other High Speeds. An assortment of Horizontal Tubular Boilers, Large Duplex Fire Pump, Brennan Crusher, Platform Scales, Burr Mill, Bogardus Mill, etc., etc.

**G. M. CLAPP,** 74 Cortland St., N. Y.

### FOR SALE.

- 20 Arc Light U. S. Electric Lighting Co. Dynamos.
- 5 Hockhausen Dynamos.
- 100 Arc Lamps
- 2 Double Hoisting Engines.
- 2 large Ferracute Circular Shears.
- 1 Bennett Air Compressor, 18-20 x 30.
- 3 Steam Fire Engines.
- 150-ton Track Scale.
- 230 New Steel Electric Car Wheels.

**WALSH'S SONS & CO.,**

260 204 Washington St., Newark, N. J.

Dealers in Scrap Iron, Metals, Machinery, etc.

## WE WANT TO BUY SCRAP,

Iron or Steel Rails,  
Busheling Scrap,  
Bridge Material, &c.

Will pay spot cash for the above in carload lots.

**G. H. SIBELL & CO.,**

Manhattan Building, Chicago.

## SECOND-HAND MACHINE TOOLS.

### ENGINE LATHES.

- 16 in. x 6 ft. Blaisdell.
- 18 in. x 8 ft. Perkins Taper.
- 18 in. x 8 ft. Blaisdell.
- 18 in. x 6 ft. New Haven.
- 18 in. x 6 ft. Bradford.
- 18 in. x 8 ft. Blaisdell.
- 18 in. x 8 ft. Wamesit.
- 18 in. x 10 ft. Blaisdell.
- 18 in. x 9 ft. D. W. Pond.
- 20 in. x 6 ft. Bullard.
- 24 in. x 12 ft. Geo. Gage.
- 26 in. x 12 ft. Fifield.

### PLANERS.

- 16 in. x 16 in. x 3 ft. Walter Bros.
- 20 in. x 20 in. x 5 ft. Ames.
- 22 in. x 22 in. x 4 ft. L. W. Pond.
- 24 in. x 24 in. x 6 ft. Whitcomb.
- 24 in. x 24 in. x 5 ft. Putnam.
- 28 in. x 28 in. x 7 ft. New Haven.

### SHAPERS.

- 10 in. Juengst Crank.
- 10 in. Wood & Light Traverse Head.
- 18 in. Putnam Traverse Head.
- 24 in. Hendey Friction.

### HAND LATHES.

- 4 10 in. x 4 in. Garvin.
- 1 12 in. x 4 ft. Garvin.
- 1 12 in. x 5 ft. Back Geared.
- 1 12 in. x 6 ft. Back Geared.

### MISCELLANEOUS.

- Garvin Profiler, One Spindle.
- 6 in. Bement Slotter.
- 36 in. Gould & E. Automatic Gear Cutter.
- 24 in. Pulley Lathe.
- 50 in. Pulley Lathe.
- 5 in. Cutting Off Machine.
- No. 2 Springfield Tool Grinder.
- No. 1 Garvin Screw Machine.
- 3 in. Squaring Shear.
- 1 1/2 ft. Power Draw Press.
- 250 lb. Gould & E. Drop Press.
- No. 2 Garvin Cutter and Drill Grinder.
- No. 1 Slate Marking Machine.
- No. 2 Garvin Automatic Tapper.
- No. 4 Sturtevant Blower.
- Garvin Wire Spring Collier.
- Several Wood Working machines.

Also a large number of other machines. Write for complete list and detailed description.

**THE GARVIN MACHINE CO.,**

Laight and Canal Sts., New York.  
Also 51 North 7th St., Philadelphia, Pa.

### FOR SALE.

- Baker Blowers, Nos. 3, 4, 5, 6, and 7 1/2.
- Root Blowers, Nos. 1, 2, 3, 4, 5, 6 and 7.
- Worthington Duplex Pump, Compound, 25 in. x 43 3/4 in. x 9 1/2 in. x 36 in., equal new.
- D. W. Pond Planer, 26 in. x 26 in. x 8 ft., equal new.
- Niles Boring and Turning Mill, 37 in., equal new.
- 9 Hewes & Phillips Lathes, 12 in. to 21 in.

Numerous Engines, Boilers, Pumps, Tanks, Crushers, Compressors, Rock Drills, Hoisting Engines, &c., cheap

**C. R. BIGELOW,** 45 Dey St., New York City.

### MACHINERY FOR SALE.

- Planer 23 in. x 24 in. x 7 ft. New.
- Drill Press, 40 in. swing. New.
- Engine Lathe, 24 in. x 25 ft. bed. 2d hand.
- Root Blowers, Nos. 1, 2, 5 and 6. 2d hand.
- Haskin Vertical Engine, 9 x 9. 2d hand.
- Improved 38 in. Band Saw. New.
- Vertical Boiler, 40 H. P. 2d hand.
- Open die Bolt Cutter 1/4 to 1 1/4 in. 2d hand.

Write us before buying. COOKE & CO., Machinery and Supplies, 163 and 165 Washington St., New York.

### FOR SALE.

- Two Double Deck Boilers, 40 H. P., Cheap.
- Iron Tanks, Square, 4 x 4 x 6, 4 x 4 x 8, 4 x 5 x 11.
- Cylinder Boilers and Flues from 8 in. to 36 in. diameter, for stacks and water. Two Radiators.
- 25 H. P. Engine and Boiler, Horizontal. 25 H. P. Locomotive Boiler. Iron Columns, several sizes. One Lathe. Blow-offs, all sizes.

**ROBERT M. CUNLIFE,**

Successor to Bussenius & Cunliffe,  
1140 and 1143 Washington Ave., Philadelphia.

### A Question of Changing these Articles into Money.

- A 50 H. P. 13 in. x 24 in. "Wilbraham" Slide Valve Engine in complete order at \$270.
- A 250 H. P. 24 in. x 60 in. Slide Valve Heavy Horizontal Engine with 10 ft. Band Wheel at \$350.
- A 10 H. P. 6 in. x 9 in. Vertical Engine at \$60.
- One 60 H. P. Horizontal Tubular Double Riveted Boiler with stack and entire fixtures at \$275.
- One 35 H. P. Vertical Tubular Boiler 48 in. x 10 ft., double riveted, A1, at \$210.
- One 12 H. P. Upright Tubular Boiler at \$85.
- One Polishing Tumbler, Mounted and Geared, with pulleys, size barrel 22 in. x 4 feet, intended for small castings, at \$60.
- One "Peck" Drop Hammer and Lifter, 200 lbs., at \$85.
- One Universal Milling Machine, old style, at \$100.
- One Duplex Steam Pump, 1 1/2 in. suction, at \$30.
- Lot Lathe Drip Pans at \$3.00 each.

**G. W. SCHULTZ & CO.,**

308 Walnut St., PHILADELPHIA.

## Special Notice.

For some time past Joseph Rodgers & Sons, Limited, have been annoyed by Pocket Knives being put on the market stamped "Rodgers' Pattern" on blades. They are advised that this stamping is a clear infringement of their rights. Notice is, therefore, hereby given that any parties found selling knives so stamped will be prosecuted.

**ALFRED FIELD & CO.,** Sole Agents  
**JOSEPH RODGERS & SONS, Limited.**  
New York, November 1, 1894.

**SECOND-HAND MACHINERY.****ENGINE LATHES.**

10 in., 11 in. and 13 in. Swing, 4 and 5 ft. Bed Lathes, Reed, Prentice and L. & M.  
15 in., 16 in., 18 in., 19 in. and 20 in. Swing, 6 and 8 ft. Bed Lathes, Dustin, Pond, Young, Fifeild and Bullard.  
24 in., 26 in., 28 in., 32 in. and 36 in. Swing, 10 ft., 16 ft. and 18 ft. Bed Lathes, Fifeild, Dustin, Blaisdell and Perkins.

**PLANERS.**

1 17 in. x 17 in. x 30 in. Hand Planer.  
1 16 in. x 16 in. x 3 ft. Crank Planer.  
1 17 in. x 17 in. x 3 ft. L. & M. Planer.  
1 20 in. x 20 in. x 4 ft. L. & M. Planer.  
1 24 in. x 24 in. x 6 ft. Pease Planer.  
1 27 in. x 27 in. x 5 ft. White Planer.  
1 60 in. x 60 in. x 22 ft. Heavy Planer with 4 heads.  
1 60 in. x 60 in. x 22 ft. Hepworth, 1 head.  
1 8 ft. Boring and Turning Mill with pulley attachment.

**DRILL PRESSES.**

2 20 in. Drill Presses, Prentice & Davis.  
1 20 in. x 36 in. Gap Lathe.  
3 Slate Drills, 1 one-spindle, 2 two-spindle.  
2 Pratt & Whitney 1 and 2 spindle.  
6 bench Drills.  
1 50 in. Heavy Geared Post Drill.  
1 each No. 2, 3 and 4 Garvin Gang Drills.

**SHAPERS.**

15 in. Stroke, Smith.  
15 in. G. & E. Make.  
17 in. and 24 in. Chase & Hendy.

**SPEED LATHES.**

10 in., 12 in. and 14 in. Swing, 3, 4 and 5 ft. Beds, Garvin and Spencer.

ALSO LARGE STOCK NEW TOOLS.

**THE NILES TOOL WORKS CO.**  
Eastern Branch, 136, 138 Liberty St., N. Y. City.

**RAILS FOR SALE.**

1000 tons 60 lb. Steel.  
150 " 60 lb. "  
1000 " 56 lb. "  
150 " 52 lb. Iron  
and Steel.  
40 tons 40 lb. Iron.  
250 " 40 lb. Steel.  
27 different gauge second-hand locomotives.  
J. H. RICHARDSON & CO.,  
Pittsburgh, Pa.

## OLD RAILS AND SCRAP IRON

bought and sold by

WM. H. PERRY & CO.,  
Providence, R. I.

## A BARGAIN.

A fine business opportunity for a live business man or two partners who have \$25,000 to invest in a first-class, old, well established and well located jobbing and retail Hardware business, which did not lose money last year. Stock is well assorted. Good location in large Eastern City. Reasonable lease of premises can be continued. This will bear full investigation. Parties who can command above amount of capital address

"BARGAIN," Box 315,  
office of *The Iron Age*, 96-102 Reade St., N. Y.

**FOR SALE.**—To close an estate, on account of death of principal. An old and well established jobbing and retail Hardware business, located in one of the largest manufacturing cities in the State of California. The best location in the State outside of San Francisco for a jobbing business. Stock is well assorted and consists of shelf and builders' hardware, mechanics' tools, bar and sheet iron, etc. Will inventory about \$40,000. Terms and statements to principals only. Address "A. B. C." Box 104, office of *The Iron Age*, 96-102 Reade St., N. Y.

## WANTED.

By a thoroughly equipped general foundry and machine works, some specialty to manufacture in the machinery line. Heavy machinery preferred. Address

"INTERNATIONAL,"  
office of *The Iron Age*, 96 102 Reade St., N. Y.

20 in. x 8 ft. Pattern

Lathe.

**MILLING MACHINES.**

1 No. 2 Reed Heavy Lincoln Miller.  
1 No. 7 Brainard Miller.  
1 No. 2 Garvin Miller.  
1 No. 13 Garvin New Pattern Miller.  
1 No. 4 Garvin Rack Feed.  
1 No. 2 P. & W. 2-spindle Profiler.  
1 Brainard Universal Cutter Grinder.

**SCREW MACHINES.**

1 Plain 12 in. Monitor, 4 in. Chuck and cut-off Hand Turret.  
1 No. 2 Garvin Wire Feed Screw Machine.  
1 15 in. x 5 ft. Fox Lathe, square arbor.  
1 17 in. Fox Turret Lathe.

**MISCELLANEOUS.**

1 Wilder No. 3 Power Punch.  
2 Stiles No. 2 Power Punch.  
1 No. 3 Open Back Press.  
1 No. 3 Hand Shear for 24 in. iron.  
1 Garvin Small Gear Cutter.  
3 Buffing Spindles.  
1 No. 1 Grinder & Emery Wheel.  
1 Machinists' Forge.  
6 Bench Swivel Vises.  
1 Jewelers' Roll Machine.  
2 Pendulum Foot Presses.  
1 Small Riveting Machine.  
1 No. 2 Garvin Horizontal Tapper.  
1 Iron Table, Metal Saw.  
2 Post Drills for Hand.  
2 No. 4 Emery Grinders.  
1 30 in. Stevens Pulley Lathe.  
1 50 in. Niles Pulley Lathe.  
1 Tweddell Hydraulic Riveter and Hoist.  
1 50 in. Niles Pulley Borer.  
1 Berry & Orton Cylinder Surfacter and Matcher

## SECOND-HAND.

One Brainard Standard Universal Milling Machine, No. 1, nearly new.

One Brown & Sharpe Universal Milling Machine, No. 4, nearly new.

One Whiton Gear Cutter.

One Pond Gear Cutter to cut 36 in. diameter, 5 in. face.

One Fifeild Engine Lathe, 30 in. swing, 12 ft. bed, with blocks to raise to 38 in.

One Planer to plane 24 in. wide, 24 in. high, 6 ft. long, in A1 condition.

## HILL, CLARKE & CO.,

156 Oliver St., Boston, Mass.

12 and 14 South Canal St., Chicago, Ill.

**FOR SALE.**

1 Davidson Pump, brass lined, 16 in. steam, 9 1/4 x 16 in.  
7 Duplex Worthington Pumps, 12 x 8 x 12. Several smaller size Duplex Pumps.  
4 Engines 20 x 24.  
2 Engines 12 x 24.  
6 Engines 10 x 24.  
1 Engine 16 x 30.  
2 Engines 10 x 10.  
25 Return Tubular Boilers varying in size from 6 to 100 horse-power each.  
14 Locomotive Boilers varying in size from 30 to 100 horse power each.  
All of the above are in good condition and will be sold cheap. Address THE EXETER MACHINE WORKS, manufacturers of elevating and conveying machinery, Pittston, Pa.

**FOR SALE CHEAP.**

About five tons Sheet Steel, Gauge 20, in pieces 10 inches long and 2 1/2 inches wide. Address D. J. C. ARNOLD,  
New London, Ohio.

## WANTED.

Price and description of 30-inch gauge Mine Locomotive. Must be in good condition.  
WOODWARD IRON CO.,  
Woodward, Alabama.

## FOR SALE.

The old established Iron, Steel and Storage business conducted for thirty years or more by the late Albert T. Converse, in Norwich, Conn.  
Since Mr. Converse's decease the business has been conducted by the Administrator at the old location, No. 23 Commerce St.  
The property for sale consists of Warehouse containing store and three lofts, with wharf property, office and wareroom furniture and fixtures and stock of Iron and Steel.  
The Real Estate, Fixtures and Furniture and stock of Iron and Steel will be sold all together at a low cash price, or, if not possible to do this, they may be sold separately.  
Any one interested may obtain particulars by addressing S. T. HOLBROOK, Administrator, River Ave., or WILLIAM F. CONVERSE, 23 Commerce Street, Norwich, Conn.

## Chicago Storage Warehouse.

General merchandise storage, with desk room if wanted, situate in wholesale district.  
Apply to

C. P. SHERWOOD,  
294-300 Franklin Street,  
Chicago, Ill.

**WANTED.**

A manufacturer wants to add to his line some new specialties that will sell to the Jobbing Hardware, Saddlery or Woodenware Trade. Address "JOB BING TRADE," office of *The Iron Age*, 96-102 Reade Street New York.

## FOR SALE.

PORTABLE STEEL RAILROAD CULVERTS; they are unique, practical, strong, cheap and just the thing to use when building ELECTRIC AND STEAM RAILROADS; they fill a long-felt want in Railroad Construction. This invention is also admirably adapted for Highway and County Road Bridges. Send for descriptive circular.

W. A. NICHOLS, Girard Building, Philadelphia, Pa.

## FOR SALE.

One No. 5 Root Blower, in use about two years. In perfect condition. Also one Cupola Shell, 72 inches in diameter, 45 feet high, 11 1/2 feet to bottom of charging door.

MENARD MANUFACTURING CO.,  
Menard, Ill.

## WANTED.

To buy for cash, first-class second-hand Engine Lathes, Planers, Drill Presses, Shapers, Milling Machines, Etc.,  
Address

THE  
FOSDICK & PLUCKER  
MACHINE TOOL  
CO.,  
Cincinnati, Ohio.

## PITTSBURGH SALES AGENCY,

J. H. HILLMAN, Manager,

No. 8 Wood St.,  
Pittsburgh, Pa.,

Offers for sale at very low prices  
BESSEMER STEEL WORKS; STRUCTURAL STEEL MILLS, also STEEL MILL FOR ROLLING BARS AND COLD ROLLING, 2 BLAST FURNACES, RUSTLESS IRON WORKS, GLASS WORKS, FOUNDRY, PLANING MILL, BRICK WORKS, and numerous other manufacturing interests and large quantity of very desirable Coal Properties improved and unimproved.

## Dealers in Coal and Iron Lands.

Examination and Reports  
on Properties.  
References on Application.

## WANTED.

By a large manufacturing establishment some new specialty to make and sell to the Jobbing Hardware, Crockery or Grocery trade. Address

"NEW SPECIALTIES,"  
office of *The Iron Age*, 96-102 Reade Street,  
New York.

## FOR SALE.

A valuable United States patent. Can be manufactured at a small cost and sold for a good price to dealers in machinists' tools, hardware manufacturers, clock manufacturers, &c. Nothing of the kind on the market. Will be sold cheap and full particulars given.

P. J. CONROY,  
Paschall, Phila.

Letters Patent No. 527,668,  
Oct. 16th, 1894.  
Metallic Tie,—Railroad.

The Patentee, unable to handle, desires to sell at once. Reasonable price. Address

J. C. COWDRICK,  
Ogdensburg, New Jersey.

**SALESMEN ATTENTION.**—We offer to salesmen, calling on the iron and wood-working trade, a remunerative line: liberal commissions; references required. Address "COMMISSION," office of *The Iron Age*, 146 Franklin St., Boston, Mass.

**WILL BE SOLD LOW.**

**Upright Boring and Turning Mill**, 38 in. swing, with two heads, for boring, turning and facing. Latest pattern. Good as new.

**Horizontal Boring and Facing Machine**, for cylinders and large frames. Revolving bar 8 in. diameter. Bores to center of 54 in.

**Upright Turret Borer**, "Brown & Sharpe's" make, for boring and facing pulleys, etc., up to 36 in.

**J. J. McCABE**, 14 Dey St., N. Y.

## Heavy Pressure PUMPS FOR SALE CHEAP.

Two pairs of

### Worthington Compound Condensing Press. Pumps

14 in. x 24½ in. x 3½ in. x 18 in. stroke. Adapted to 2000 lbs. pressure per square in. In good order. Complete, with condensers.

**The United States Projectile Co.**

1st Ave. and 53d St., BROOKLYN, N. Y.

## RARE BARGAINS For Sale.

One Brown & Sharpe No. 2 Full Automatic Screw Machine complete. Good as new.

One 66 in. swing 6 ft. table Bement Horizontal Boring machine complete. First-class condition. Will be sold at low prices. Address

BOX 561,

Philadelphia, Pa.

## FOR SALE.

A 4 Horse Power Gas Engine in good running order, now in use by us at our stores.

**EDWARD DARBY & SONS**,  
233 Arch St., Philadelphia, Pa.

## A Modern Rolling Mill

admirably adapted and situated for furnishing, at lowest cost of production, brass, copper and other metals, in sheets, rods and wire, are desirous of opening negotiations with some consumer and manufacturer of these goods who is anxious to extend his business and employ more capital. Address

"MODERN MILL,"

office of *The Iron Age*, 96-102 Reade St., N. Y.

## HARDWARE and AGRICULTURAL BUSINESS FOR SALE.

A good opening for any one wanting to go into business. Wanting to get out of business I offer my entire stock of Hardware and Agricultural Implements for sale. This is a good opening for a live man. The business is well established and is a money maker. A better opening cannot be found anywhere. The right kind of a man can work up a large trade. The stock can be reduced to suit the purchaser. Good reasons for selling. Address **A. D. HOGENDOBLE**, Osborn, Ohio.

## WANTED.

Western Manufacturers will buy Staple Hardware and House furnishing Goods to sell with their own line. Special prices expected to warrant cataloguing and pushing. Address "WESTERN MANUFACTURERS," office of *The Iron Age*, 96-102 Reade St., N. Y.

## Standard Scale and Fixtures Co.,

DEALERS IN AND JOBBERS OF

Standard Scales, Warehouse Trucks, Baggage Barrows, Wheelbarrows, Car Movers, Money Drawers, etc., etc.

**Standard Scale & Fixtures Co.**,  
821 North 3d Street and 818 North 4th Street,  
ST. LOUIS, MO.

## J. A. COLEMAN,

Author Coleman's Mechanic's Liens in Illinois  
Attorney at Law,

82 Hartford Building, Chicago.  
MECHANIC'S LIENS EXCLUSIVELY.

## TO LET FOR MANUFACTURING USES.

At South Easton, Pa., on line of Lehigh Valley Railroad and on Lehigh Canal. Sidings in buildings. Electric light. Electric street railway. One main 2-story building, 275 ft. x 45 ft. Steam Engine, Shafting and complete appurtenances for first-class factory or machine shop. One high 1-story building, 80 ft. x 45 ft. Cement floor. One 2-story building, 35 ft. x 45 ft. ground floor suitable for smith shop, etc.

These buildings were erected for galvanizing and barb wire plant, and more recently, for several years, have been in the occupancy of The National Switch & Signal Co. They form part of the plant of The Stewart Wire Co., being separated from its main plant by the Lehigh Canal. Affords a most desirable opportunity for industry using wire in any of its forms and is an exceptionally fine location for manufactory of any character.

Will be let in whole or in part, with or without the adjacent thoroughly equipped and complete Wire Drawing Mill, steam and water power, situated on same side of Canal. For further particulars address

**THE STEWART WIRE CO.**,  
Easton, Pa.

## TO RENT.

A comfortable and convenient office, nicely carpeted, steam heat and gas, including desk and office furniture, on second floor, No. 2½ Murray St. Also floor space if desired. Cheap to the right party.

**D. A. GOODRICH.**

## FOR SALE.

One of the oldest established retail and wholesale Hardware, Stove and Plumbing businesses in Luzerne County. Situated at Wilkes-Barre in the heart of the richest coal field in America. Will sell stock reasonable and charge nothing for good will. Will either sell or give liberal lease on building, which is 25 by 104 ft., six stories high, on one of the most prominent business corners in the city. Our reason for selling is, our manufacturing business in another part of the city has grown to such proportions that we desire to devote our entire attention to same.

**W. B. BERTELS, SON & CO.**,  
186 East Market St.,  
Factory, Cor. Canal & Butler Sts.,  
Wilkes-Barre, Pa.

## To Manufacturers and Hardware Dealers. FOR SALE.

A NOVELTY in a WEDGE for Axes and Tools with wood handles, in ten sizes. Patented, July 25th, '93. The only wedge on the market. If the handle shrinks the wedge can be driven deeper and the handle cut off flush and it will hold.

ALSO a new invention in SLIDING DOOR LATCHES, patented November 26, '89. These latches are for stable doors and gates. By turning other side up can be used as a straight gate or thumb latch. Can be made as cheap as ordinary latches.

The Wedge and Latches were ILLUSTRATED on pages 56 and 84 of *The Iron Age* of October 18th, 1894. Patents for sale or will take partner with small capital on six patents in the hardware line. Write for samples, etc.

**W. H. THOMAS,**

Jenkintown, Pa.

## Special Notice

to Hardware buyers. You can buy Trowels and other tools too numerous to mention, of superior quality, at prices to suit the times. Address all communications to

**CHAS. A. VAUGHN**, Manufacturer,  
Vineland, N. J.

## HARDWARE STORE FOR SALE.

One of the oldest established retail Hardware stores in Eastern Indiana, located in county seat of 2500 population, in the center of rich agricultural and manufacturing district. Stock in good condition. Only one other hardware store in town. Will sell reasonably. Address

office of *The Iron Age*, 22 & 24 Pickering Building, Cincinnati, O.

FOR SALE

## HOISTING ENGINES

MANUFACTURED BY

**THE JOHN F. BYERS MACHINE CO.**  
RAVENNA, OHIO.

WRITE FOR CATALOGUE.

## IMPORTANT AUCTION ANNOUNCEMENT.

**E. Bissell, Son & Co.,**

**AUCTIONEERS,**

Tuesday and Wednesday, Nov. 13th & 14th,  
at 10 o'clock each day,

At Nos. 12 Murray St. and 15 Park Place, N. Y.

## Large, Special and Unreserved Trade Sale

Of several thousand dozen Table Knives and Forks, Pocket Knives, Butcher Knives, Carvers, &c., comprising a large line of desirable patterns.

*Fine Goods* suitable for *Thanksgiving* and *Holiday Trade*. Also *Several Hundred Dozen* Silver-plated Tea and Table Spoons and Forks, extra plate on eighteen per cent. Nickel Silver.

ALSO A LINE OF

*Wm. Rogers Mfg. Co. First Quality Tea and Table Spoons* on eighteen per cent. Nickel Silver.

ALSO A LINE OF

*Rogers* silver plated Medium Knives, also fine *Pearl Handle Medium and Dessert Knives, Fruit Knives and Nut Picks*; also a large line of *Fine Carvers*; also 1000 Dozen fine nickel plated Scissors and Shears; also, to close an account, 50 Fine Single and Double Barrel Breech Loading Guns, Manufacturers' Samples; also 2000 pairs *Winslow's* Number 0 *American Club Skates*, assorted 7½ to 12 inch; also by order of *The Hartford Silver Plate Co.*—in Liquidation—100 Lots fine *Quadruple Plated Silver Ware*, including Casters, Berries, Tea Sets, Writing Sets, Tea Caddies, Card Receivers, &c., &c. Goods will be sold in quantities to suit Jobbing and Retail Trade.

This will be our *Last Cutlery Sale for this season* and will be worthy the especial attention of the *Entire Trade and Department stores*.

## COMPLETE SET OF

Plumbers' Iron Pipe and Fitting Patterns, includes arbors, benches, flasks, &c., for sale low. Address "OWNER,"

110 Beekman St., New York.

## ADOLPH BUTZE,

Manufacturers' Agent.

Railroad, Packing House and Contractors' Supplies.

—AGENT FOR—

LATROBE STEEL WORKS, Locomotive and Car Wheel Tires. UNITED RUBBER CO., Hose, Packing, &c. GEO. GRIFFITHS CO., Shovels, Scoops, &c. Corrugated Galvanized and Sheet Iron, Plate, Tank and Bar Iron, Waste—White, Colored and Wool.

Bank of Commerce Bldg. St. Louis, Mo.

## Collections!

ATTENTION! Merchants and Manufacturers.—We collect your past due accounts. Do not let them remain too long upon your books. Send for our draft book.

**THE HARDWARE BOARD OF TRADE, Ltd.**,  
4 and 6 Warren street, New York.  
**JAS. H. GOLDEY, Treas.**

## ALLENTOWN HARDWARE WORKS.

Manufacturers of the latest and most improved Locks, Butts, Knobs, General Builders' Hardware, &c. Electro, Brass, Silver, Bronze and Nickel Plating, House Door Trimmings, Sash Locks, Sash Pulleys, Casters, Bronze and Brass Work of all descriptions. High Grade Light Gray Iron Castings, Soft, Smooth and Easily Drilled. Patented Articles a specialty. Superior Quality. Estimates furnished on application from drawings and specifications. Bronze, Brass and Composition Castings. Japanning, Metal Art Work. Common Iron Castings made to order at short notice. First Premium and Dipolma awarded for the best and most artistic display of General Hardware. Fine Iron and Brass Castings and Metals by the Pennsylvania State (Bethlehem) and Allentown Fairs. Architects and Builders are invited to examine our patent new style door lock, the best, most stylish and complete manufactured. Also manufacturers of Refrigerator Locks and Trimmings of new, beautiful design, finish and of the latest pattern, made expressly for the coming season, without exception the best ever used on a refrigerator. Write for catalogue and full information to

P. O. Address, ALLENTOWN, PA.

## L. W. POND MACHINE CO., WORCESTER, MASS.

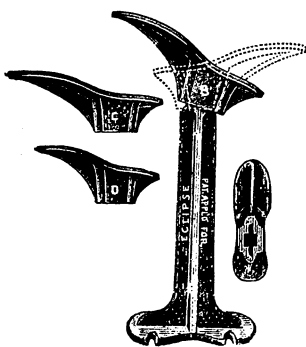
IRON PLANERS.

EXTRA HEAVY.

LATEST DESIGNS.

MODERN IMPROVEMENTS.

## Eclipse Shoe Stands and Lasts.



Reversible  
and  
Common  
Shoe Lasts.

Lap Lasts,  
Shoe Rests,  
&c., &c.

Patented May 1st, 1894.

For Prices and Circulars address

John C. Kupferle,

ST. LOUIS, MO.

## The Williams Printing Co., Commercial Printers, and Binders.

Estimates Furnished for all Classes of Work.

96-102 Reade St. - New York.

## ALBANY, N. Y. RECEIVER'S SALE VALUABLE PROPERTY.

A Grand Opportunity to Purchase a Manufacturing Plant Cheap.

Taxes Low, Insurance Low. The Town will Offer Many Inducements.

Henry L. Smith, Receiver of the Albany Horse Nail Company, offers for a limited time at private sale, the following:

Lot, 367 ft. x 367 ft. 9 in., upon the Bank of the Hudson River, and in addition, land under water to center of channel of river. Lot contains one main building 52 ft. by 208 ft. Slate roof, wood and iron frame, solid brick floor, office and store rooms; thoroughly equipped with steam heat, independent water supply, first-class drainage. Also one brick and iron roof boiler house adjoining main building. Main building contains one compound Duplex Engine, 200 horse-power, of the very best and latest make, with all modern appliances; 200 feet of main shafting with pulleys, cups, and all complete. Boiler house contains two 100 horse-power boilers with all modern appliances.

Everything new, foundation of engine, setting of boilers and all detail thoroughly first-class.

Location just across Albany city line on the bank of the Hudson River. Dock privileges within 75 feet, and D. & H. C. Co. branch track within 60 feet of building. No cartage. Title absolute.

Property must be sold. Correspondence solicited. Receiver will give all information, and invites inspection.

Will sell separately or with the plant the following:

Large quantity of counter shafting. Foster air pump No. 2. Sturtevant blower No. 8, noiseless, with counter shaft. Grindstone and solid oak frame, stone 6½ inch face and 6 feet diameter. Weight of stone 2026 lbs. Emery wheels with table. Two Superb oil tanks, designed to contain oil for fuel. Dimensions, 6 ft. diameter, 24 ft. long. Bumptead Heads, man hole, caulked inside and out. Perfectly tight and guaranteed under pressure of 30 lbs. All of the above absolutely new, never used, all in good condition. Also many miscellaneous tools, scales, &c., &c. All new.

Entire plant suitable for almost any large manufacturing. Address or call upon

HENRY L. SMITH, Receiver,

50 State Street, Albany, N. Y.



**HELP WANTED.**

*Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.*

**HARDWARE SALESMAN** with an established route through the Southern States to sell a good article as a side line; salary. BOX 200, Painted Post, N. Y.

**EXPERIENCED SALESMAN** to represent a large jobbing house in Pennsylvania; must be fully acquainted with the hardware and cutlery trade and must have acquaintance in the State; write giving locality covered. Address "H. & C. TRADE" office of *The Iron Age*, 220 So. 4th St., Philadelphia.

**EXPERIENCED SALESMAN** for New York and Pennsylvania, fully acquainted in hardware and cutlery and already having an acquaintance in both States. Address "J. G. P." office of *The Iron Age*, 220 So. 4th Street, Philadelphia.

**A MAN** to do enameling; one who thoroughly understands mixing, lining and firing. Address "ENAMEL," office of *The Iron Age*, 312 The Cuyahoga, Cleveland, O.

**TRAVELING SALESMAN** for special territory in every State, visiting the hardware and household goods trade, who will carry our aluminum goods as a side line. Address "MANUFACTURER," office of *The Iron Age*, 59 Dearborn St., Chicago.

**SITUATIONS WANTED.**

*Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.*

**A MECHANICAL ENGINEER**, 40 years of age, with long and large experience in the management of large business enterprises and also in estimating, contracting and purchasing, desires a position where his abilities will be appreciated. The best references can be given. Address "M. E." office of *The Iron Age*, 59 Dearborn St., Chicago.

**I DON'T KNOW** it all, but am willing to work under the instructions of my employer; am 29 years of age, married, have had twelve years' business experience with leading manufacturers, as bookkeeper, correspondent, managing clerk, etc.; have had some experience in preparing costs and estimates on light metal goods. Address "AMERICAN," office of *The Iron Age*, 96-102 Reade St., New York.

**BUYER.**—By a young man of 25, as buyer with some purchasing agency or export house; can furnish references as to ability; is at present employed but is willing to change at once. "BUYER," No. 118, office of *The Iron Age*, 96-102 Reade St., New York.

**YOUNG MAN**, 19 years of age, desires position with good hardware house; three years' experience with same; quick, accurate and neat in execution of work; college bred and can furnish the best of references. Address HUGH HAMMOND, JR., 30 E. Trade Street, Charlotte, N. C.

**TRAVELING SALESMAN**, fifteen years' experience in Eastern, Middle and Southern States, with heavy hardware, railroad and contractors' supply dealers, wishes to carry a side line on salary or commission; references exchanged. Address "C. S.," Box 118, office of *The Iron Age*, 96-102 Reade St., New York.

**TO BRASS FOUNDERS.**—A practical brass molder of many years' experience on steam and water work, plumbers' supplies and general jobbing, six years' experience in handling help, one who is willing to hustle, well up in the mixing of metal, coremaking and all the details of foundry, desires a position as Foreman; location no object; references. Address "C. M. K.," Belleville, N. J.

**A FULLY COMPETENT HARDWAREMAN**, fifteen years' practical experience, for past ten years buyer and office manager of one of the largest jobbing houses in the country, a thorough accountant and correspondent, desires to connect himself with substantial concern in similar capacity; knows shelf and heavy hardware from A to Z; references unexceptionable. "MANAGER," P. O. Box 2766, N. Y.

**A YOUNG MAN** of 7 years' experience in hardware, stoves and house furnishing goods wishes to correspond with good manufacturing firms with view of representing them in Northern Ohio; A1 references furnished. Address "H. E. B.," Sta. F, Cleveland, O.

**EXPERIENCED PIG IRON SALESMAN**, now with an established house, wishes to make a change; well acquainted with buyers in New York and New England and can command some trade; salary moderate. "S. N.," Box 118, office of *The Iron Age*, 96-102 Reade St., N. Y.

**WANTED.**—A thoroughly competent bookkeeper and office man; one familiar with hardware business, a good correspondent and capable of managing finances; must commence duties at once; salary \$1200 per year; only those with good business qualifications need apply. Address, giving references, D. C. WELLER, Erie, Pa.

**WANTED.**—A contractor, or iron mine operator, to work an important mine not over one hundred miles from New York; only those who are thoroughly practical and have ample responsibility need apply; answer with full particulars, "MINE OWNER," office of *The Iron Age*, 96-102 Reade St., New York.

**A MAN** competent to invent articles of mechanical hardware; one who has had experience and can show reference as to ability. Address "HARDWARE," office of *The Iron Age*, 220 So. 4th St., Philadelphia.

**AS TRAVELING SALESMAN**; has had 14 years' experience as such in hardware, iron, etc., in Northwest; best of references. Address "HARDWARE," Box 2, Lake Park, Wash.

**A FOUNDRY FOREMAN** of long experience and first-class qualifications will be open for an engagement end of October; thoroughly posted in cheap methods of production either in iron or steel; highest testimonials as to ability and personal character. Address "X. Y.," office of *The Iron Age*, 146 Franklin St., Boston, Mass.

**HARDWAREMAN**, 24 years old, seven years' experience, wishes position as clerk in store or to travel. BROWN, 6138 Hoeveler St., E. E., Pittsburg, Pa.

**AS SUPERINTENDENT OR FOREMAN** of architectural iron work; had charge of big jobs, good rigger, derrick man and finisher; able to handle men and work according to plans; best of references. Address "E. K.," Box 111, office of *The Iron Age*, 96-102 Reade St., New York.

**AS SUPERINTENDENT**, by man of large experience in, and thorough practical knowledge of, steam and hydraulic machinery; also mill machinery and construction work. Address "STEAM AND HYDRAULIC," office of *The Iron Age*, 96-102 Reade St., New York.

**AS CLERK OR SECRETARY** to mechanical engineer, by man who is a practical bookkeeper, good correspondent and familiar with drawings and machinery. Address "CLERK OR SECRETARY," office of *The Iron Age*, 96-102 Reade St., New York.

**AGENCY WANTED.**—Desire to handle the product of first-class, pushing, energetic foundry; want grey iron, brass, composition and bronze castings; will make New York headquarters if satisfactory arrangements can be made; A1 references given and required. Address "FOUNDRY AGENT," office of *The Iron Age*, 96-102 Reade St., New York.

**MAN OF EXPERIENCE** in the manufacture of hardware seeks position; disengaged November 1st; understands thoroughly both iron and brass foundry in all branches. Address "METALLIC," office of *The Iron Age*, 96-102 Reade St., New York.

**A COMPETENT, ACTIVE BUSINESS MAN**, with long experience as a rolling mill man, ager, wants a position; is well posted in the manufacture of plates, sheets, sections and general merchant bar iron and steel, understands how to turn out good work at lowest cost and is accustomed to purchasing all supplies. Address "R. W. A.," Box 1027, office of *The Iron Age*, 96-102 Reade St., N. Y.

**BY A THOROUGHLY EXPERIENCED** hardware and stock keeper; can manage store and do the buying if necessary; have had four years' experience on the road; would make contract with a good firm; good references. Address L. W. VIVION, 131 Emma St., Dallas, Texas.

**SUPERINTENDENT OR CHIEF ENGINEER**, by mechanical engineer of large and varied experience in hydraulic machinery, structural work in iron and steel, installation of plants, transmission of power, cranes, etc.; thoroughly conversant with modern methods of construction and shop practice. "MODERN METHODS," office of *The Iron Age*, 96-102 Reade St., N. Y.

**A GENTLEMAN** of extensive business experience with one of the largest manufacturing concerns in the United States, would like to open correspondence with reliable parties in need of a capable man for position of trust and responsibility; unqualified references can be furnished from former employers and the leading bankers and business houses in the city where he resides. Address "CUSHMAN," No. 1011, office of *The Iron Age*, 96-102 Reade St., New York.

**THE LATEST BOOKS.**

**Farrian System of Correspondence and Business Forms**; for use in common schools, high schools, normal schools, business colleges, academies and self-instruction. By J. W. FARR, 114 pages, cloth. \$1.00

**Practical Handbook of Drawing for Modern Methods of Reproduction.** By C. G. HARPER. 161 pages, illustrated, plates, cloth. \$2.50

**A Text-Book on Roads and Pavements.** By F. P. SPALDING. 213 pages, illustrated, cloth. \$2.00

**A Text-Book of Ore and Stone Mining.** For the use of mine owners, mine managers, prospectors and all interested in ore and stone mining. By CLEMENT LE NEVE FOSTER, D.Sc., F.R.S., Professor of Mining, Royal College of Science; H. M. Inspector of Mines. With 700 illustrations, large 8vo. \$10.00

**The Architects' Directory for 1894.** Containing a list of the architects in the United States and Canada, classified by States and towns, together with index of prominent dealers in and manufacturers of building materials and appliances. \$1.00

**Theory and Practice of Design.** An advanced text-book on decorative art. By FRANK G. JACKSON. Illustrated, cloth. \$2.50

**Qualitative Analysis.** For use in instruction in chemical laboratories. By I. UDWIG MEDICUS. Translated by J. MARSHALL. Cloth. \$1.50

**Select Methods in Chemical Analysis** (chiefly inorganic). By W. CROOKES. Third edition, rewritten and enlarged. 718 pages, illustrated, 8vo, cloth. \$8.00

**Descriptive Catalogue of Essential Oils and Organic Chemical Preparations.** Compiled by F. B. POWER. 96 pages, 8vo, boards. \$1.00

**Farrian System of Bookkeeping**; for use in common schools, high schools, normal schools, business colleges, academies and self-instruction. By J. W. FARR. 100 pages, cloth. \$1.00

**Farrian System of Business Arithmetic**; for use in common schools, high schools, normal schools, business colleges, academies and self-instruction. By J. W. FARR. 350 pages, cloth. \$1.00

**How to Build Dynamo-Electric Machinery.** Embracing theory designing and the construction of dynamos and motors, with appendices on field-magnet and armature winding, management of dynamos and motors, and useful tables of wire gauges. By E. TREVERT. 339 pages, illustrated, cloth. \$2.50

**How to Become a Successful Electrician.** The Studies to Be Followed, Methods of Work, Fields of Operation and Ethics of the Profession. By T. O'CONNOR SLOANE. 16mo, cloth, illustrated. \$1.00

**The Engineer's Year Book of Formulas, Rules, Tables, Data and Memoranda in Civil, Mechanical, Electrical, Marine and Mine Engineering.** By H. R. KEMP. 700 illustrations, 8vo., cloth. \$3.20

**Elementary Metal Work.** A practical manual for amateurs and for use in schools. By C. G. LELAND. 111 pages, 4to., cloth. \$1.50

**Refuse Destructors, with Results Up to Present Time.** A Handbook for Municipal Officers, Town Councilors and others interested in Town Sanitation. By CHARLES JONES. With a paper on the utilization of town refuse for power production. By THOMAS TOMLINSON. 8vo, cloth, 2d and revised edition. \$2.00

**Practical Instructions in Quantitative Assaying with the Blowpipe.** By E. L. FLETCHER. 142 pages, morocco, \$1.50; cloth, \$1.25

**The Metallurgy of Gold.** T. KIRKE ROSE, 462 pages, illustrated, cloth. \$6.50

**The Mineral Industry, Its Statistics, Technology and Trade in the United States and other Countries.** From the earliest times to the end of 1893. By R. P. ROTHWELL. Vol. II, 4to., cloth. \$5.00

**The Animal as a Machine and a Prime Motor and the Law of Energetics.** By R. H. THURSTON. 12mo, cloth. \$1.00

**The Practical Application of Dynamo-Electric Machinery.** By C. K. MACFADDEN and W. D. RAY. 187 pages, illustrated, cloth. \$1.00

**An Introduction to the Study of Metallurgy.** By W. C. ROBERTS AUSTEN. Third edition, 379 pages, illustrated, cloth. \$4.00

**Kitchen Boiler Connections.** A selection of practical letters and articles relating to Water Backs and Range Boilers. Compiled from THE METAL WORKER. The main divisions of the volume are as follows: Water Backs and Their Construction; Boiler Construction, Operation and Connections; Circulating Pipes; Multiple Connections; Double Boilers; Difficulties Met in Every Day Practice; Relief Pipe and Vacuum Valves; Horizontal Boilers; Miscellaneous; Heating Room from Kitchen Boiler; Radiators Heated from Coils in Stoves. 71 illustrations; 8vo, 140 pages, Cloth. \$1.00

**Electrician at Home.** In Two Parts. Part I. Electro-Plating at Home, by GEORGE EDWINSON. Part II. Electric Bells, by GEORGE EDWINSON. Illustrated with numerous diagrams and explanatory sketches. Edited by F. CHILTON YOUNG. 12mo, cloth. (Amateur's Practical Aid Series.) \$0.40

**The Practical Electroplater.** A Comprehensive Treatise on Electroplating, with notes on ancient and modern gilding, and formulas for new solutions. By MARTIN BRUNOR. 8vo, half leather, illustrated. \$10.00

Sent, post-paid on receipt of price by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 READE ST., NEW YORK.

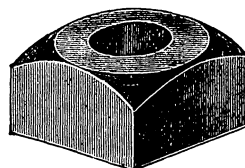
THE  
**American**  
Iron and Bolt Co.,

MANUF'RS OF

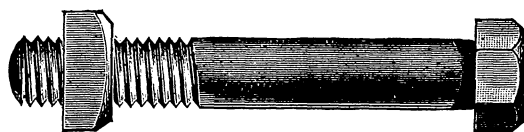
Bar, Roofing  
And Stove Pipe Iron,  
Bridge Rods, Hinges, Bolts,  
Nuts and Gimlet Pointed  
Coach Screws,

Cincinnati, Ohio.

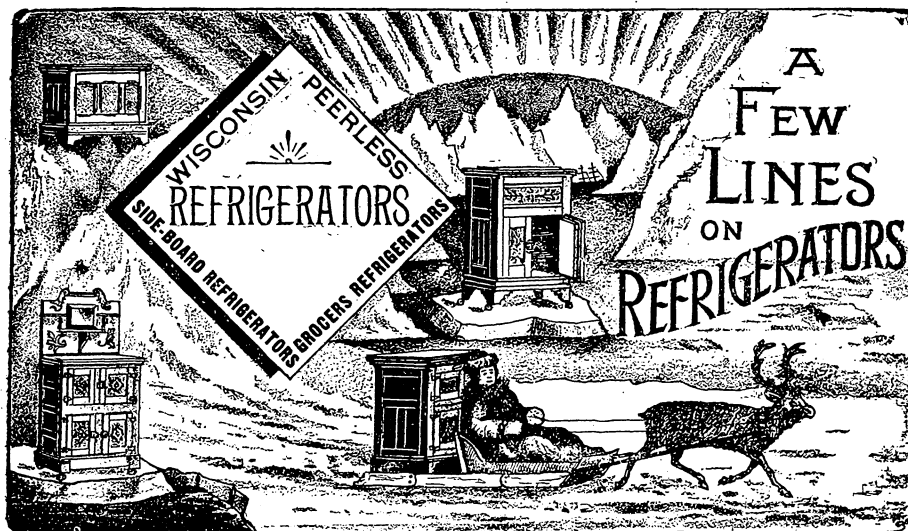
Successors to  
L. M. DAYTON.



(1)



(2)



FROM DEALERS LOOKING FOR THE

## Best Refrigerator Made

We solicit an opportunity of presenting the merits of our

"Wisconsin Peerless."

Mineral Wool Filling. Absolutely cleansable. More and better talking points than all other makes combined. Absolute guarantee. Seventh season.

For Catalogue address

The Wisconsin Refrigerator Co.

EAU CLAIRE, WIS.

**"Expert"** has been defined—by some tincutty: "One who is prepared to prove anything for a satisfactory consideration." Co-incidentally, it is a significant fact that the SELF-CONFESED "ADVERTISING EXPERT" has recently become extinct, and gives promise of remaining so. The quondam "Expert," with a unanimity worthy of note, now limits his claims to simple OMNISCIENCE, or to a felicitous blending of OMNISCIENCE with OMNIPOTENCE. So much for the abstract.

For obvious reasons I am not an "Expert," while a very mild type of OMNISCIENCE will instantly recognize the absurdity of any claims I might advance to such an attribute.

Treating of Advertising matters, I have issued two publications—rather more perhaps than circulars, considerably less than books, neither of them works of genius, both of them obviously and avowedly FINITE.

Number 2—treats of the Trade Circular; Number 9—of some phases of Newspaper and Periodical Advertising. Both will be mailed to those whose longing for light would seem to warrant the sending of five 2-cent Postage Stamps to the subscriber.

MENTION THE IRON AGE.

FRANCIS I. MAULE, 330 Chestnut Street, Philadelphia.

## BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and bookseller, 96-102 Reade St., New York.

## The Layman Pneumatic Sporting Boat.

Life Preserver and Boat Combined.



A lighter, safer and more convenient boat than was ever before on the market; it weighs but fifteen pounds; is easily collapsed and folded into a small package; absolutely safe in any waters; propelled by the feet thus leaving the hands free to use gun or rod; made in four compartments, of the best rubber duck cloth; has loops for erecting a blind to shield you from the game; is quickly inflated, and in every way a success.

Made and sold by the Goodyear Rubber Co., 487 Broadway, to whom you can send check and they will forward goods. We have our headquarters with them.

AMERICAN RUBBER BOAT CO., New York.

# IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

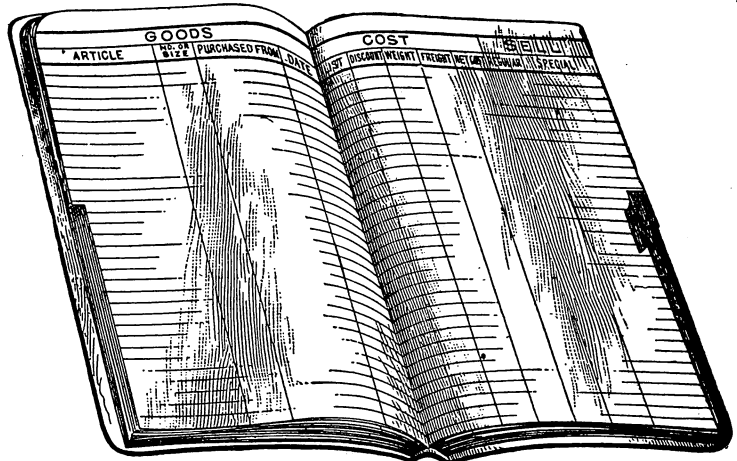
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

#### FOUR EDITIONS:

A, 200 pages,	-	-	-	-	-	\$1.00
A F, 200 pages with flap,	-	-	-	-	-	1.25
A 2, 400 pages,	-	-	-	-	-	1.50
A F 2, 400 pages with flap,	-	-	-	-	-	1.75



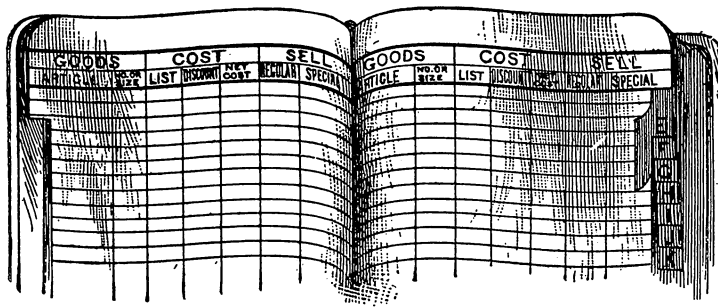
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

#### FOUR EDITIONS:

B, 200 pages	-	-	-	-	-	\$1.00
B F, 200 pages with flap,	-	-	-	-	-	1.25
B 2, 400 pages,	-	-	-	-	-	1.50
B F 2, 400 pages with flap,	-	-	-	-	-	1.75



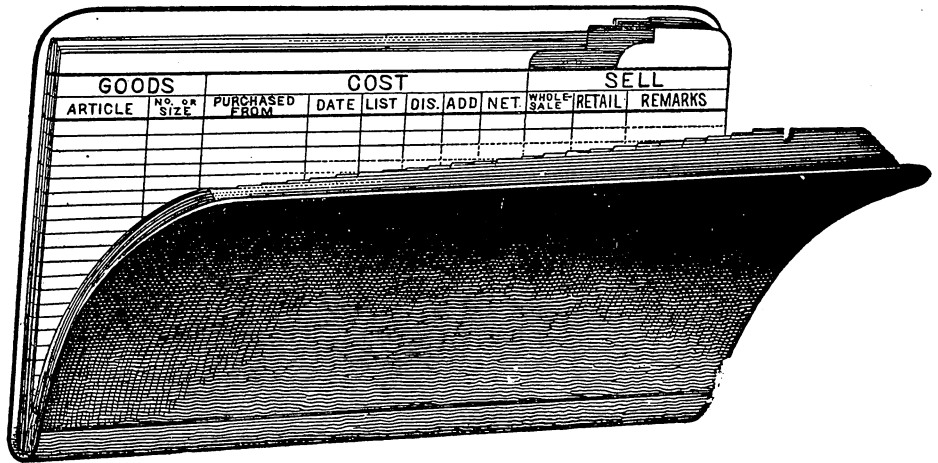
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

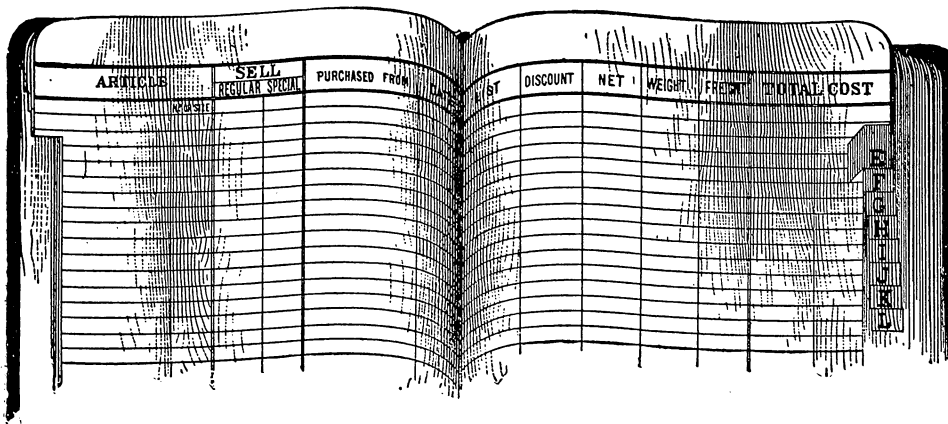
Size, 4½ x 7½ in.; grain seal leather.

#### FOUR EDITIONS.

C, 200 pages,	-	-	-	-	-	\$1.00
C F, 200 pages with flap,	-	-	-	-	-	1.25
C 2, 400 pages,	-	-	-	-	-	1.50
C F 2, 400 pages with flap,	-	-	-	-	-	1.75



Hardware Price Book C.



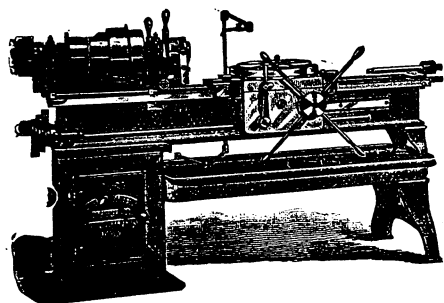
Hardware Price Book D.

Arrangement is adapted to the requirements of the trade in this direction.

Size 5¼ x 8 in.; grain seal leather.

FOUR EDITIONS.	D, 200 pages,	-	-	-	-	\$2.00	D 2, 400 pages,	-	-	-	-	\$3.00
	D F, 200 pages, with flap,	-	-	-	-	2.50	D F 2, 400 pages, with flap,	-	-	-	-	3.50

Sent, post-paid, on receipt of price by **DAVID WILLIAMS, Publisher, 96-102 Reade St., New York.**



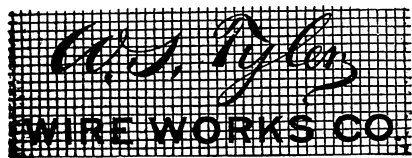
HAVE YOU A  
**FLAT TURRET LATHE ?**

If not send for

**RAPID LATHE WORK.**

**JONES & LAMSON MACHINE CO.,**

SPRINGFIELD, VT., U. S. A.



MANUFACTURERS OF

**Extra Heavy Double Crimped Wire Cloth**  
FOR STAMP BATTERIES.

Steel, Iron, Brass and Copper Cloth for Coal and Ore  
Screens, Flour Mills, Paper Mills and Maltsters

W. S. TYLER, Pres. PROCTOR PATTERSON Sec. & Treas.  
CLEVELAND, OHIO.

**LABORATORIES OF**  
**DR. GIDEON E. MOORE,**  
221 Pearl St., New York.

DEPARTMENT OF CHEMISTRY. Analyses and  
Assays of Ores, Metals, Waters, Fuel, Oils and  
Natural and Industrial Products of every  
description.

DEPARTMENT OF PHYSICAL TESTS. Chas. F.  
McKenna, Director. Tensile, Transverse and  
Compression Tests of Iron, Steel and other  
Metals and Alloys, Cements, Building Stones  
and Engineering Materials generally. Tests of  
Lubricating Value of Oils, etc., etc.

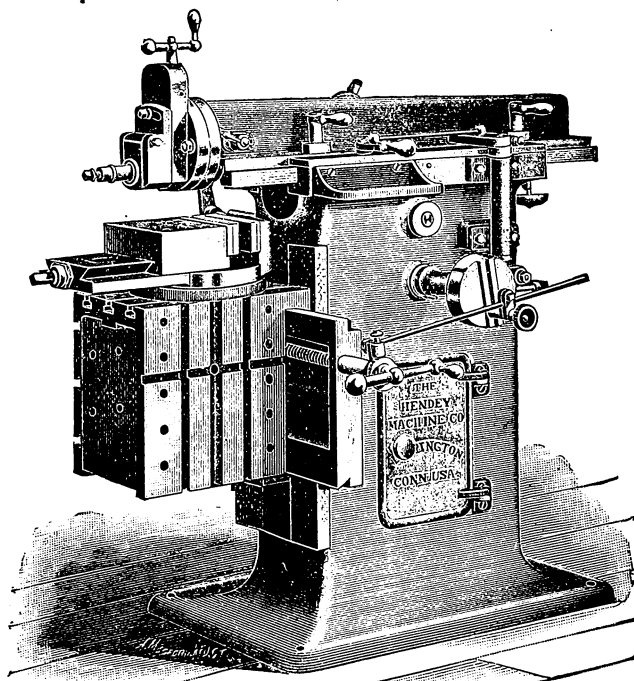
PRINTED PRICE-LISTS ON APPLICATION.

**The Pittsburgh Reduction Co.**

Pittsburgh Office, 701 Ferguson Block,  
119 Third Ave., Pittsburgh, Pa.  
New York Store, 4 Havemeyer Build-  
ing, Cor. Church and Dey Sts., N. Y.

**ALUMINUM**

Ingots, Plates, Bars, Sheets,  
Wire, Tubes and  
Castings.



24-inch Improved Hendey Shaper.

**COMBINES the LATEST and BEST Improvements.**

Useful Attachments, Strong and Powerful. Changes  
Made Rapidly. Uniform Cutting Speed. For Tool  
Room use or all around Machine Shop Work.

**THE HENDEY-NORTON LATHE.**

It stands at the head. It has no rival.

It represents modern ideas and modern practice in  
Screw Cutting Engine Lathes.

We challenge a comparison of its conveniences,  
Useful attachments and every day merits with ANY lathe made.

Buy the best. Keep up with the times.

Send for Circulars.

**The Hendey Machine Co., Torrington, Conn.**

EUROPEAN AGENTS:

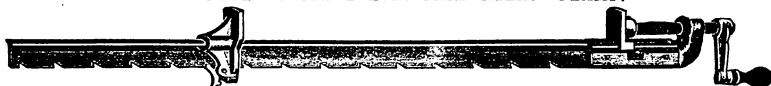
SCHUCHARDT & SCHUTTE, Berlin.  
CHAS. CHURCHILL & Co., London.  
EUGEN SOLLER, Basel, Switzerland.

**CYLINDER BORING MACHINES.**

**NEWARK MACHINE TOOL WORKS,**  
**NEWARK, N. J.**

**CLAMP,**  
**CLAMP,**  
**CLAMP.**

THE STEARNS STEEL BAR CARPENTERS' CLAMP.



**IT HOLDS.**

The strongest, most powerful, most convenient and  
best finished.

Lengths, 3, 4, 5, 6, 7, 8, 9, 10 foot.

**E. C. Stearns & Co., Syracuse, N. Y.**

# JUST OUT. KITCHEN BOILER CONNECTIONS

—A SELECTION OF—

Practical Letters and Articles Relating to Water  
Backs and Range Boilers.

Compiled from **THE METAL WORKER.**

71 Illustrations, 8vo, 140 Pages, Cloth, Price, \$1.00.

The Plumbing and Letter Box departments of *The Metal Worker* have contained many articles on the work of setting range boilers and overcoming the difficulties commonly encountered. The extensive correspondence that the discussion of these topics has called forth indicates the widespread interest that they attracted, and the letters coming from all parts of the country and from practical men, who have written from their personal experience, constitute a most valuable source of information. The descriptions are plain, and the illustrations add all that is required to make them clear and comprehensive.

These articles have been carefully edited and are now embodied in a book, which is divided into two parts, the first on water backs and boilers and their connections, and the second on heating rooms from range boilers.

The main divisions of the volume are as follows: Water Backs and Their Construction; Boiler Construction, Operation and Connections; Circulating Pipes; Multiple Connections; Double Boilers; Difficulties Met in Every Day Practice; Relief Pipe and Vacuum Valve; Horizontal Boilers; Miscellaneous; Heating Room from Kitchen Boiler; Radiators Heated from Coils in Stoves.

Sent, post-paid, on receipt of price, by

David Williams, Publisher and Bookseller,  
96 -102 Reade Street, New York.

## WHITE MOUNTAIN FREEZERS.

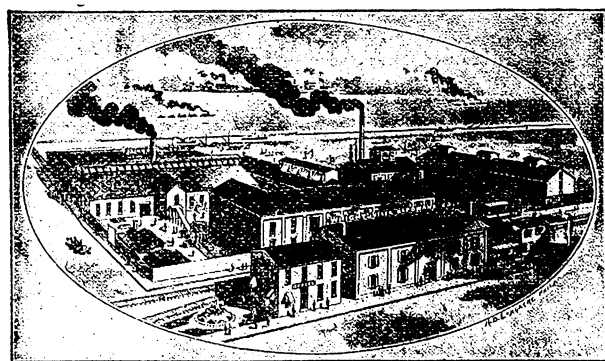
THE  
BEST  
FREEZER.

Heavy Waterproof Tubs. Cans of Charcoal Tinplate. Malleable Iron Dashers. All inside parts tin-plated. Gearing completely covered.

Inquire of any leading jobber or write us.

THE  
BEST  
SELLER.

The White Mountain Freezer Co., Nashua, N. H.



Wrightsville Hdw. Co.,  
WRIGHTSVILLE, PA.,

Successors to the  
Shepard Hdw. Co.,  
Buffalo, N. Y.,

In the following lines:  
BLIND HINGES  
GATE HINGES AND LATCHES  
AND FRAME PULLEYS.

Manufacturers of  
Cabinet and Builders'  
Hardware, Iron Toys and  
Specialties in Iron.

AGENTS,  
SURPLESS, DUNN & ALDER, 16  
Murray St., New York.  
Henry Keidel & Co., 25 Hanover  
St., Baltimore, Md.  
Chas. L. Pierce & Co., 202 Market  
St., San Francisco, Cal.

## COVERT'S VICTOR WAGON JACK



Has no equal. The lever power is enormous. Only one size required, as it adjusts itself to and will lift with ease the lightest carriage or heavy truck. Weighs only 7½ lbs. Has straight lift and will not tilt. Being made of iron it is indestructible.

The Price is the Lowest.

We are headquarters and  
No. 300. the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,  
FARMER, N. Y., U. S. A.

1895

# Columbia Bicycles

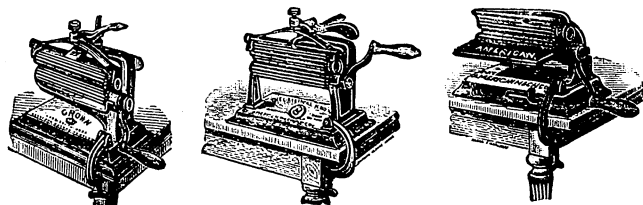
\$100.

Can You Sell Columbias?

## MECHANICS



DIPLOMAS AWARDED. Courses in other trades, all including thorough instruction in Mathematics and Physics. Send for FREE Circular, stating subject you wish to study, to The Correspondence School of Mechanics, Scranton, Pa.



Crown. Original Knox. American.

### FLUTING MACHINES.

FOR CATALOGUE, PRICE AND DISCOUNTS WRITE TO

North Bros. Mfg. Co., - Philadelphia, Pa.

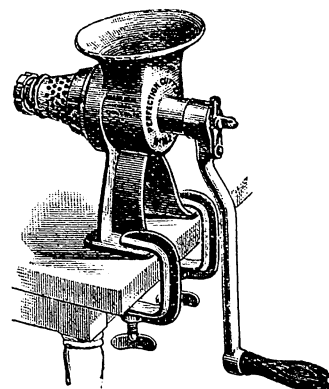
or JOHN H. GRAHAM &amp; CO., Manufacturers' Agents, 113 Chambers St., New York.

The NEW 1894  
PATTERN

### PERFECTION CUTTER.

Improved and Enlarged.

Simple to use.  
Easily cleaned.  
Of few pieces.  
No parts to wear out.





# CLARK'S BEST QUALITY SCREW DRIVERS.



Four Drivers and one Handle; all interchangeable; are hardened and tempered all over; made of best stock, and finished first-class.

FOR SALE BY ALL HARDWARE DEALERS.

MANUFACTURED BY

**R. H. BROWN & CO.**  
NEW HAVEN, CONN.

*You take no risk on the quality.  
We make only the best!*



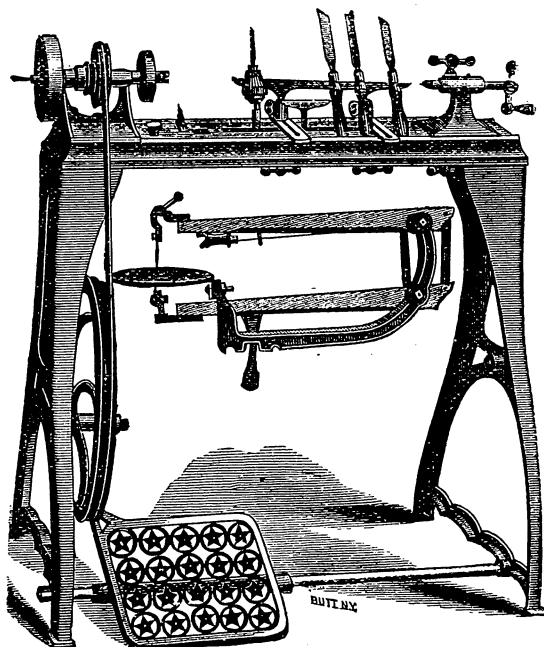
**Sand Papers** (Flint Paper  
Garnet Paper  
Emery Paper  
Emery Cloth)  
in Reams and Rolls

**HAIR FELTING** for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

**BAEDER, ADAMSON & Co.**

730 MARKET STREET, PHILADELPHIA.  
67 BECKMAN STREET, NEW YORK.  
143 MILK STREET, BOSTON.  
182 LAKE STREET, CHICAGO.

# HOLIDAY GOODS.



Many kinds of Scroll Saws have been put on the market by ourselves and other manufacturers during the past twelve years. Of these only a few have proved good enough to remain in demand. The call now is for a well-made, practical machine, and all second-class ones are of slow sale.

Those who want a good Lathe with Scroll-Sawing Attachment and all Tools and Improvements to the very latest moment will buy the Goodell Lathe.

Those who want only a Scroll Saw with Drilling Attachment and Rubber Blower will prefer the Rogers Saw.

These two machines are taking the place of all others, and are now the most in demand throughout the world.

No dealer can make a mistake by laying in a stock of them. About Christmas time they are wanted in every town, and will make business lively at this otherwise dull season.

We also keep a full stock of Designs, Wood, and all other Scroll Sawing goods.

**Price of Goodell Lathe, complete, \$12.00.**

**Price of Rogers Saw, complete, \$3.50.**

# MILLERS FALLS CO.,

93 READE ST., NEW YORK.

# THE GEM SOLID STEEL MINCER

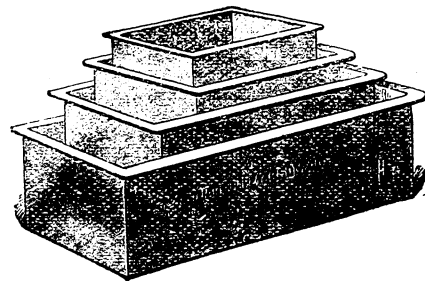


Single and  
Double Blades.

Handle and Blade Formed in one piece.  
Always Clean. Indestructible.  
No Rivets to Wear Loose.  
No Wooden Handle to Shrink, Swell, loosen, Split, or Fill with Rancid Grease.

MANUFACTURED BY  
**PALMER HARDWARE MFG. CO.**  
TROY, N. Y.

# DO YOU USE THEM?



**TANKS**  
**ALL SIZES.**  
PLAIN OR  
PORCELAIN LINED.

SPECIAL GOODS TO ORDER.

# THE STUART & PETERSON CO.,

BURLINGTON, N. J., U. S. A.

# BOOKS

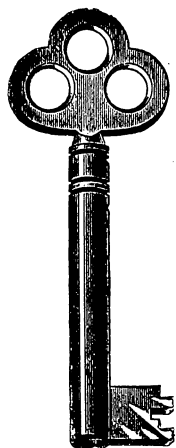
THE NEWEST BOOKS ON Metal Working, Iron, Steel and Metallurgy; Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting; Draftsmanship Architecture and Building, promptly supplied on receipt of price.

SEND FOR CATALOGUES, mentioning the kind of book you are looking for.

DAVID WILLIAMS, 96-102 Reade St., New York.

# CABINET LOCKS

OF EVERY KIND.



DRAWER LOCKS,  
CUPBOARD LOCKS,  
WARDROBE LOCKS,  
CHEST LOCKS,  
DESK LOCKS.

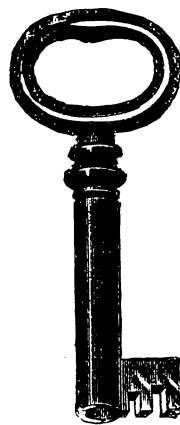
A complete line of more than 1000 list numbers exclusive of our old and complete line of

**YALE CABINET LOCKS.**

**THE YALE & TOWNE M'F'G CO.,**

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.



The only question is

## Is it Le Page's?

If it is you have made a sale. **HUNDREDS** of **THOUSANDS** of **PLEASED** and **SATISFIED** **CUSTOMERS** testify to the merits of

**~LE PAGE'S LIQUID GLUE.~**

If you sell it you do not have to **WASTE ANY TIME** in answering questions as to its quality.

The people **KNOW** that **LE PAGE'S GLUE** is the **BEST**. They have used it for years and have proved our claims to be true.

**It is the only Glue made WITHOUT ACIDS.**

A dealer who regards his time as worth anything will not risk losing his **CUSTOMERS' CONFIDENCE** by trying to sell something which is **CLAIMED** to be "just as strong" and "just as good as LePage's."

Don't let your customers go to another store for what they want, but **SELL THEM WHAT THEY ASK FOR.**

We can furnish original and attractive advertising matter for "**LE PAGE'S GLUE**" upon request.

**SEND FOR CIRCULARS AND PRICE-LIST.**

**RUSSIA CEMENT CO,** Gloucester, Mass.

NEW YORK OFFICE, 95 Reade and 113 Chambers Streets.

PACIFIC COAST OFFICE, 23 Davis St., San Francisco, Cal.

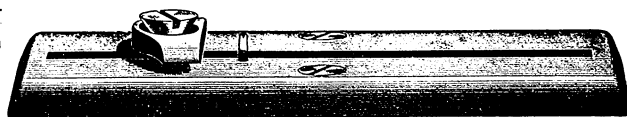
## This is the "SALEM" HANGER,

A BRAND NEW  
ARTICLE OF  
"BUILDERS'  
HARDWARE,"

AND WE WANT THE HARDWARE TRADE TO WRITE US FOR SAMPLE AND PRICES.

Write us for Sample.

The W. A. South Co., Salem, Mass.



### NEW ADJUSTABLE BENCH LEVEL.

WITH GROUND AND GRADUATED VIAL.

4-6 and 8 inch.



Three Sizes.

MANUFACTURED BY

**C. F. RICHARDSON & SON,**

ATHOL, MASS.



**WM. KROGSRU,**  
Engraver and Die Sinker,  
61 Fulton St., N. Y.  
Manufacturer of  
**STEEL STAMPS**  
For Every Purpose.  
Steel Letters and Figures.  
Burning Brands, Stencils,  
&c. Send for Illustrated  
Catalogue



## Yacht AND Boat Hardware.

**L. W. FERDINAND & CO.,**  
BOSTON, MASS.

Send for 226-Page Catalogue.

THE MARTY FRENCH TRAPS FOR RATS AND MICE.

## Great Reduction in Price.

On account of the lower rate of duties under the new tariff we are now prepared to furnish all sizes at greatly reduced prices, which we shall be glad to quote on application.  
Remember we are the **sole importers** of the **genuine Trap**. All others are flimsy and worthless imitations.

**BURDITT & WILLIAMS,** Boston, Mass

# W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

## Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

## DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

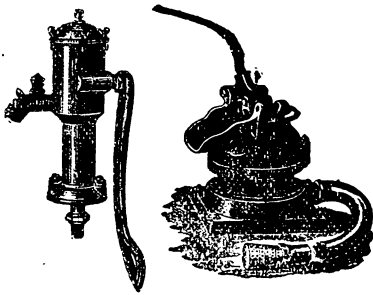
A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries;

Fig. 208.

Fig. 381.

Fig. 145.



or wherever it is desired to raise a large quantity of water by  
**hand power.**

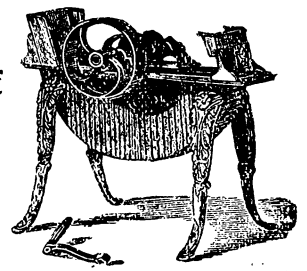
The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

### CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.  
Made either as shown in cut for Hose or for **IRON** Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

**THE DEMING FACTORY**  
SALEM O.U.S.A.  
MANUFACTURERS OF  
HAND & POWER PUMPS, WELL SUPPLIES & C. VERTICAL STEAM PUMPING ENGINES.  
N.Y. OFFICE: 72 JOHN ST.  
MENTON & HUBBELL  
GEN'L. WESTERN AGT.: 55 & 57 N. CLINTON ST. CHICAGO, ILL.

ARTESIAN WELL CYLINDERS  
HYDRAULIC RAMS

## PRENTISS' PAT. VISES.

The Leaders for 20 Years.

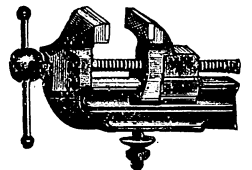
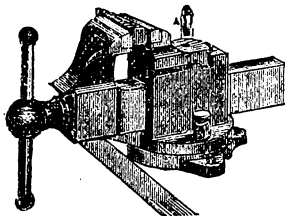
Send for Illustrated Catalogue  
of

ALL KINDS OF VISES.

PRENTISS VISE COMPANY,

MANUFACTURERS,

44 Barclay St., New York.



## F.E. MYERS & BRO.



Ashland Pump and Hay Tool Works.

## PENINSULAR ALL-ROUND SHOVELS

SPECIALLY ADAPTED FOR USE IN  
THE FURNACE ROOM.

The larger sizes make excellent snow and barn shovels. Best Quality Steel.

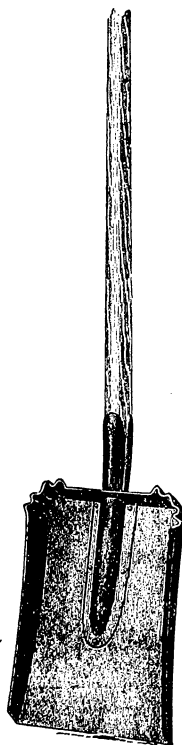
### DOUBLE EDGE—CORNERS FOUR PLY.

Long-handled, light, stiff and shapely. The lightest Steel Furnace Shovel made, at the same time very stiff and durable. The only shovel on the market the proper shape both for handling coal and for taking up ashes. Can be used for any purpose for which any other shovel is commonly used. Prices much lower than any other shovel used in the furnace room. Three sizes:

No. 10, 8½ x 15.

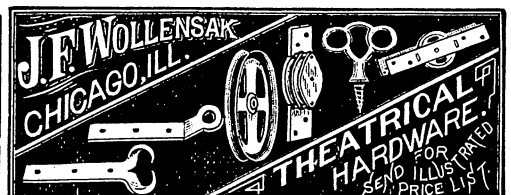
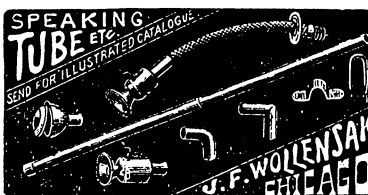
No. 15, 9½ x 15.

No. 20, 10½ x 15.



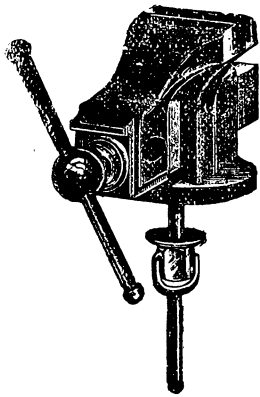
Peninsular Metal Works,  
Detroit, Mich.

The New York Safety Dumb Waiter.  
"The Manhattan Dumb Waiter."  
The Improved Huinohrey Hand Elevator.  
Made special to be sold by Hardware Stores.  
Thousands in use. Catalogues on application.  
**THE STORM MANUFACTURING CO.**  
NEWARK, NEW JERSEY.  
Formerly of Roughkeepsie, New York.





**Athol Machine Co.,**  
Selling Agents.



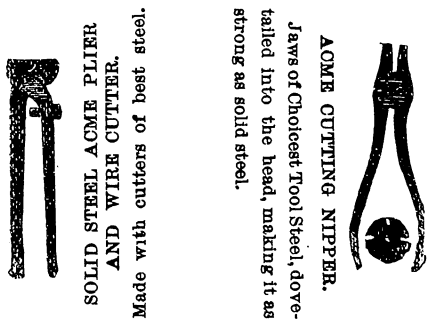
**HOLLANDS' OFFSET JAW VISE.**

Specially adapted for drill press work where chucks cannot be used and equally good for special or regular bench work.

**Hollands Mfg. Co.,**  
ERIE, PA.,  
Manufacturers all styles VISES.

## ACME CUTTING TOOLS.

Made in all Sizes.



**HIGGANUM HARDWARE CO., HIGGANUM, CONN.**

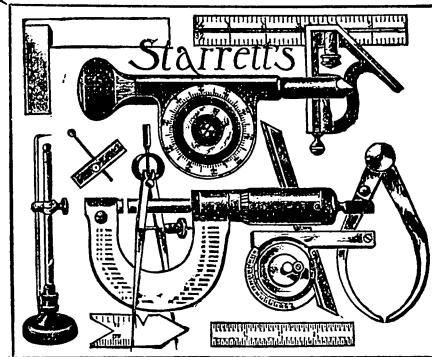
New York Office, 18 Old Street.

Skilled mechanics prefer them

Live dealers sell them

# STARRETT'S

Best in workmanship  
Finest in finish  
Latest in improvements

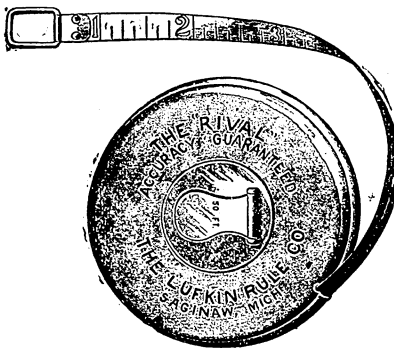


For all workers in metal or wood  
Every tool warranted satisfactory

# FINE TOOLS

Send for Catalogue

L. S. Starrett, Athol, Mass.



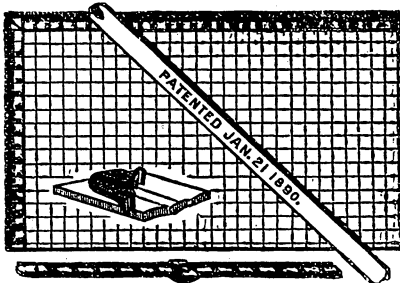
## "RIVAL"

## Steel Measuring Tapes.

Something New! A low priced Steel Tape. First-class and fully guaranteed. Nickel Plated Case. Flush Handle.  $\frac{3}{8}$  in. Tape. Marked one side only. Made 25, 50, 75, 100 feet lengths.

**LUFKIN RULE CO., Saginaw, Mich.**

NEW YORK OFFICE, 2½ MURRAY ST.



## The Canton Glass Board.

Cuts any Fraction of an Inch by Eighths.

Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

— ALSO —

**IMPROVED TRAMMEL RULE for Cutting Circles**

From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

Send for Circular.

**The Canton Saw Co., Canton, Ohio**

Warranted Better than the Best

## ENGLISH ANVIL

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

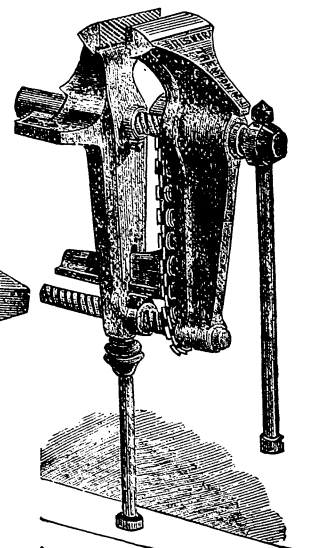
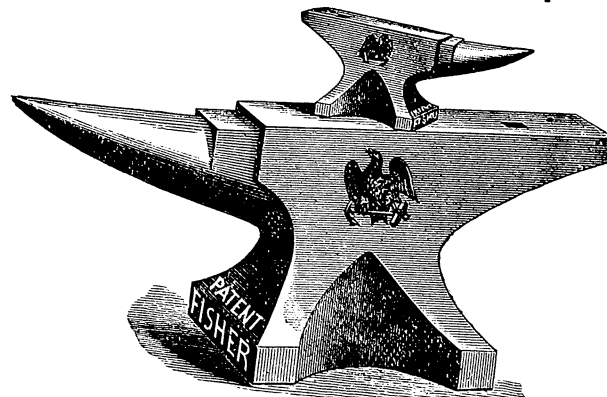
## FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

ESTABLISHED 1843.  
MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

## EAGLE and "FISHER" Stamp.



**EAGLE ANVIL WORKS,**

**Trenton, N. J.**

Sold in New York by our Agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co., 45 Chambers St.

**F. B. EARLE, Sec.**

## OPERATING

**SEND FOR PRICE-LIST.**

**GENERAL OFFICE :**

**NEWARK, - - New Jersey.**

**WITH RUBBER CUSHIONED JAWS.**

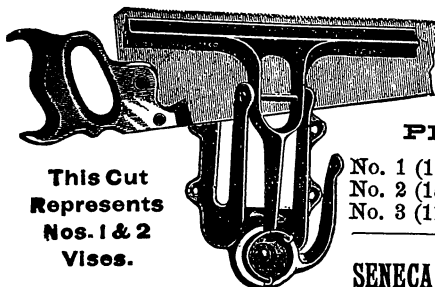
**Prevent all vibration and render Saw Filling noiseless.**  
*Will make no more noise than Filling on a Solid Piece of Iron.*

**Have a Larger Sale than All Other Kinds Combined.**

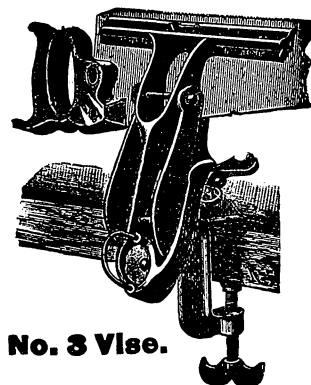
PRICE LIST.		LIBERAL DISCOUNT TO THE TRADE.
1 (11 inch Jaws),	PER DOZ. \$15.00	LONGEST JAWS, HEAVIEST AND BEST FINISHED. Sold by all leading jobbers of general Hardware at Factory Prices.
2 (15 inch Jaws),	21.00	
3 (11 inch Jaws),	18.00	

—MANUFACTURED BY—

**SENECA FALLS MFG. CO., 255 Water St., Seneca Falls, N. Y.**



**This Cut  
Represents  
Nos. 1 & 2  
Vises.**



### No. 3 Vlase.

**BRANCH HOUSES:**

Memphis, Tenn.  
Chattanooga, Tenn.  
Minneapolis, Minn.

# ATKINS' COLUMBIAN CROSS-CUT SAW.

MANUFACTURED UNDER OUR PATENTS

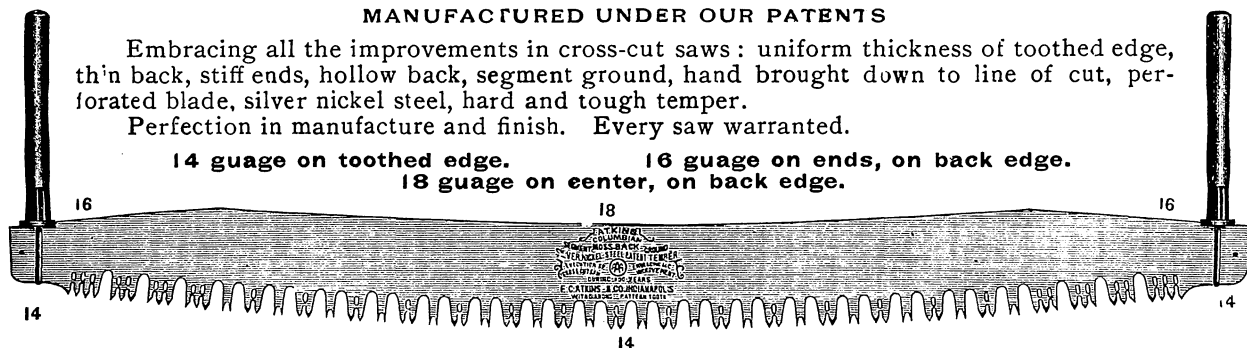
Embracing all the improvements in cross-cut saws: uniform thickness of toothed edge, thin back, stiff ends, hollow back, segment ground, hand brought down to line of cut, perforated blade, silver nickel steel, hard and tough temper.

Perfection in manufacture and finish. Every saw warranted.

**14 guage on toothed edge.**

**16 guage on ends, on back edge.**

18 guage on center, on back edge.



The toothed edge of the Columbian Saw will remain same thickness until teeth are worn out—on other saws teeth become thinner as they wear out.

**CHAS. W. HOEFIG,**  
 ENGRAVER AND DIE SINKER,  
 52 FULTON ST., - N. Y.  
**STEEL STAMPS,**  
 BRASS DIES, BURNING BRANDS, &c.  
 Designs on Steel Finely Executed.

# JOHN LOYD.

**Machine Knives, Shear Blades,  
Presses and Dies.**

**Nos. 558 to 562 Water Street, New York**

THE

SIMONDS

SIMONDS MFG. CO. GOLD MEDALS AND HIGHEST AWARDS.

NEW ORLEANS

BOSTON 1887

SAN FRANCISCO 1889

CHICAGO 1893

PHILADELPHIA 1876

AND INNUMERABLE AWARDS

WE MAKE SOLID TOOTH AND INSERT POINT

CIRCULAR SAWS: STRAIGHT SAWS SUCH AS GANG, MILL, MULAY AND

DRAG SAWS. AND THE CRESCENT GROUND CUT.

BAND SAWS FROM ONE EIGHTH TO TWELVE INCHES WIDTH. ALL KINDS

OF SCROLL SAWS WE ARE THE LARGEST MANUFACTURERS OF MACHINE KNIVES IN THE WORLD.

AND

KNIVES

WE MAKE EVERYTHING IN THE SHAPE OF MACHINE

OUR ADDRESSES ARE SIMONDS MFG. CO. ST. LOUIS, MO.

ST. LOUIS, MO.

SIMONDS MFG. CO. ST. LOUIS, MO.

SIMONDS MFG. CO. ST. LOUIS, MO.

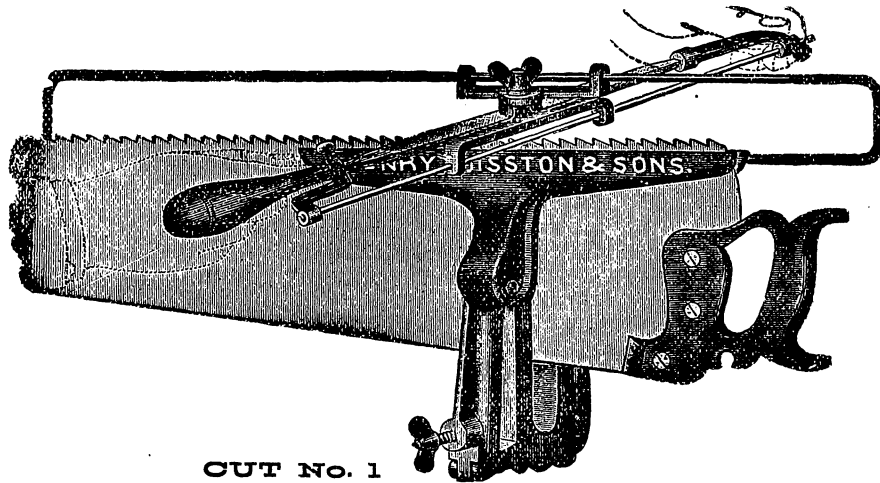
SELLING AGENCIES L.A. KIMBALL 107 LIBERTY ST. NEW YORK CITY.

SIMONDS MFG. CO. LTD. 23 MAGAZINE ST. NEW ORLEANS, LA.



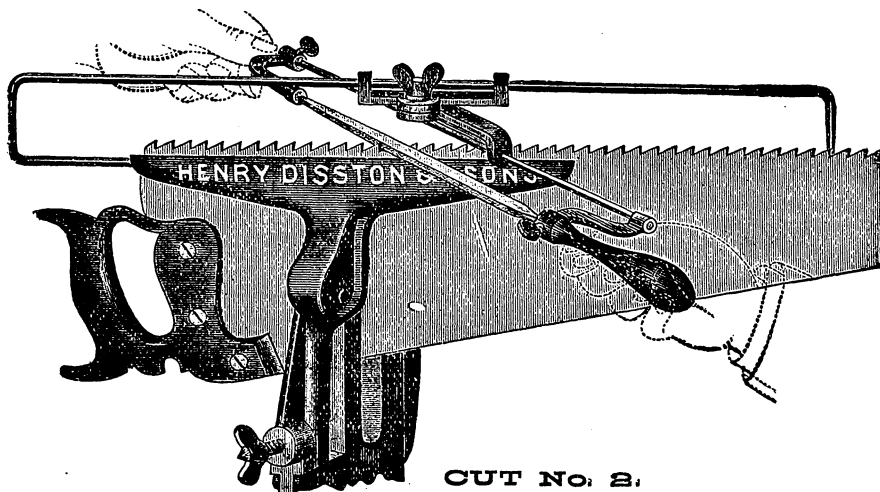
# DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART  
OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1

Cut No. 1 shows a saw and the attachment in proper position for filing the first side, and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.

To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.


A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.


Write for price including No. 3 Clamp, Filing Guide, File and Handle complete. Packed one in a wooden box.

**Henry Disston & Sons, Philadelphia, Penn.** INCORPORATED.

# ARCADE FILE WORKS.

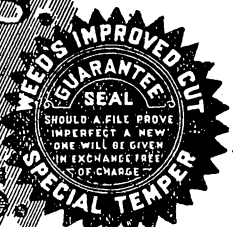


## WARRANTED FILES AND RASPS.



EASTERN OFFICE.  
NEW YORK.

WORKS,  
ANDERSON, IND.



WESTERN OFFICE.  
CHICAGO.

**THE FILES THAT LEAD THEM ALL.**  
THE BEST EQUIPPED FILE WORKS IN THE WORLD.



### PAYNE'S BUSINESS EDUCATOR.

600 pages, bound in cloth, \$2.

Every business man should have some knowledge of the State and general laws of the country, especially those affecting the collection of accounts, rates of interest, &c. He should be able to draw up many of the simpler papers, such as leases, contracts, &c. He should be familiar with the different forms of legal papers used in business, and, above all, he should be an easy and pleasant letter-writer. All these points are carefully treated in Payne's Business Educator.

Among the subjects specially discussed are :  
**Commercial Correspondence.**—Over 150 models of letters are given, covering every phase of business correspondence.

**Legal Forms Used in Business.**—Articles of copartnership; notice of dissolution form of assignment; short form of deed; bill of sale; power of attorney; lease; surety; will; notes—promissory, negotiable, non-negotiable and demand; exchange—inland and foreign; acceptance; due bill; receipt; bills of lading; private cost marks, &c.

**Dictionary of Mercantile Terms.**—Giving a full and clear explanation of terms used in business.

**Titles.**—Official, military, scholastic, naval and professional titles used in the United States.

**Useful Hints for Measuring Land.**

**Legal Rates of Interest,** foreign coin, weights and measures compared with American standards.

**Rules for Punctuation.**

**Rules of Order** for deliberative assemblies and debating societies.

**Interest Tables,** and tables of weight and measures, &c.

**How to Use a Typewriter,** with lessons for practice.

**Exercise in Practical Penmanship.**

**Laws and Forms.**—An epitome or the laws of the United States and of the different States of the Union, which will be found invaluable to those who are forced to appeal to the law, as well as to that large class who wish to avoid it. The whole is alphabetically arranged, so as to make reference easy. Forms are given for a great number of legal papers, &c.

**Dictionary of synonyms;** marks of account; list of abbreviations; French, Spanish, Latin and Italian words and phrases, &c.

Making in all the most complete self-educator published.

Any book published sent, postpaid, on receipt of price, by

**DAVID WILLIAMS,**

*Publisher and Bookseller*

96-102 Reade Street, New York.

### TAINTOR POSITIVE SAW SET

No. 93.

Retail

Price

\$1.00.



Made Entirely of Steel.

Will not slip on the teeth.  
Will not cut or mar the teeth.  
Has but one gauge to set.  
Any set may be reproduced.

Sole Agents:  
**WIEBUSCH & HILGER, Ltd.**  
New York, U.S.A.

## FINEST Mechanical Tools.

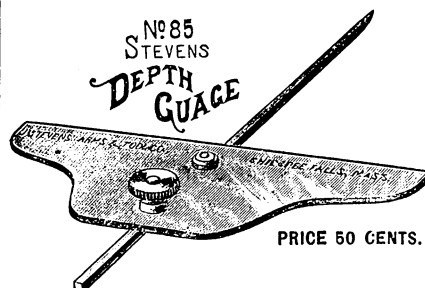
No. 125 STEVENS UNIVERSAL BEVEL

PRICE  
1 1/2 IN. .... \$1.25  
3 IN. .... \$1.50



STEVENS A. & T. CO.  
CHICOPEE FALLS,  
MASS. U. S. A.

No. 85  
STEVENS  
DEPTH  
GAUGE



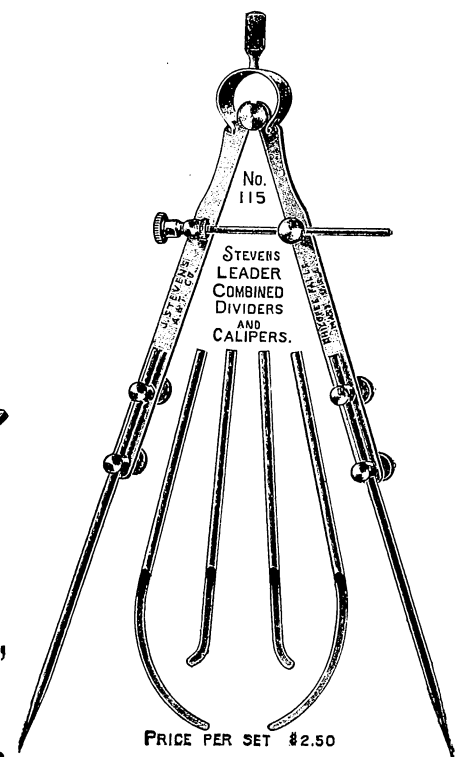
PRICE 50 CENTS.

Send for Catalogue of full line.

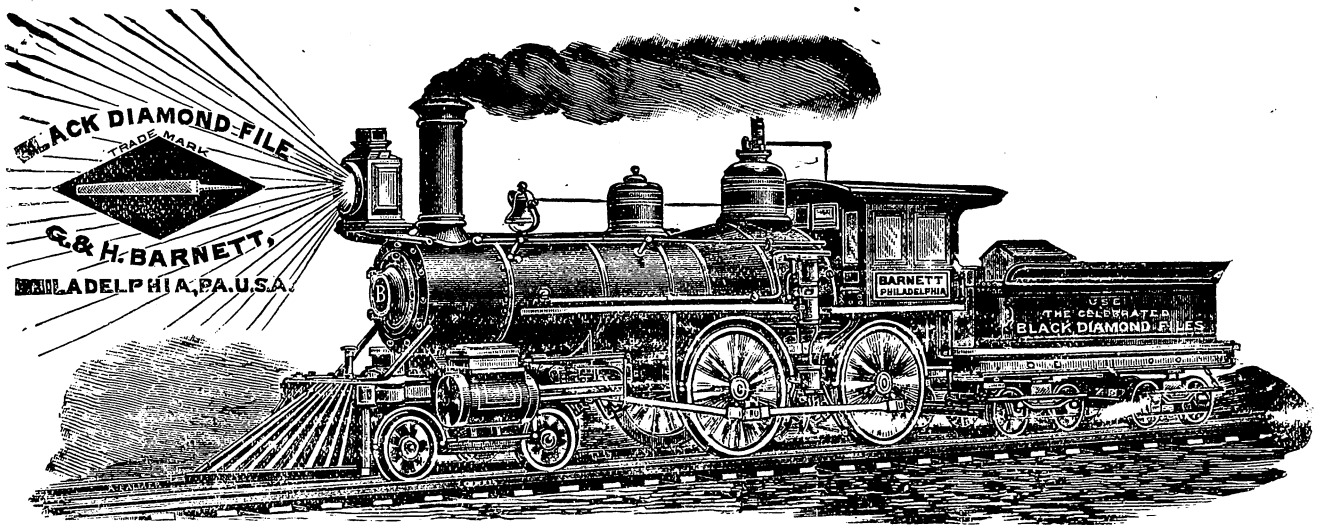
**J. Stevens Arms & Tool Co.,**

P. O. BOX 5729,

Chicopee Falls, - Mass.



PRICE PER SET \$2.50



THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

# NICHOLSON FILE CO.

PROVIDENCE, R. I.

3000  
VARIETIES FILES  
[X.F.] AND INCREMENT CUT FILES

J. M. KING & CO.,  
WATERFORD, N. Y.

Manufacturers of  
**BUTTON'S**



**Pat. Wire Cutter  
AND PLIER COMBINED.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and  
MACHINISTS' STOCKS and DIES, PLUG and  
TAPER TAPS, HAND, NUT and SCREW  
TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

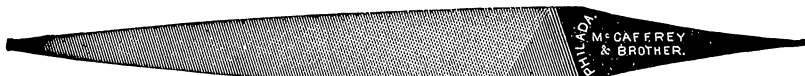
Established by DANIEL B. KING, 1829.

Philadelphia, 1876.



**McCaffrey File Co.,**  
FIFTH and BERKS STS.,  
PHILADELPHIA, PA.

For Superiority.



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

*Superiority acknowledged wherever used, sold or exhibited.*

**HOWARD IRON WORKS,**  
BUFFALO, N. Y.,

Manufacturers of

**BOLT CUTTERS**  
AND NUT TAPPING MACHINES,  
(Schlenker's Patent),

Send for Illustrated Catalogue.

**3** NICKLE, Silver and Bronze Metallic  
Figures and Letters, Sizes  $\frac{1}{16}$  in to 3 in.  
Pattern Letters, Steel Stamps, Brands,  
Dies &c. Send for Reduced Price List.  
We make a specialty of the Hardware Trade.  
A. A. WHITE & CO., Providence, R.I.

**HARDWARE  
SHELF BOXES**

Made of Wood.  
No screws or  
nails used to work  
out and cut  
your shelving.

Look the matter up. Descriptive circular with list  
of references and prices mailed on request.  
We also make Wire Stretched Folding Paper Boxes  
and all other kinds of Paper Boxes. Write us.  
JESSE JONES & CO., 615 and 617 Commerce St., Philadelphia.

BEST "TROJAN" HORSE RASPS AND FILES.

CRUCIBLE  
STEEL.



LOWEST  
IN  
PRICE.

STRONGEST  
TOOTH.

**BANKER & WHITE,**  
(Troy File Works.)

TROY, N. Y. LET

N. Y. Agent, GEO. M. MATTESON, 111 Duane St.

US  
QUOTE.



# John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority,  
against all Competitors, from

**THE YEAR SEVENTEEN HUNDRED & FIFTY,**  
and are still in increasing demand. As in the past, it is the unalterable  
**DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.**  
**WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.**

**SOLE AGENTS FOR THE UNITED STATES.**  
Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.

## As a Labor Saver

There is no single thing in the line of hardware  
equal to the



**AMIDON CORNER BRACE.**  
The Amidon Tool Corporation,  
Manufacturers of

A Complete Line of Bit Braces,  
1451 Niagara St., Buffalo, N. Y.  
John H. Graham & Co., Sole Agts.,  
111 Chambers St., N. Y.

CORNER BRACE

**AMERICAN TOOL COMPANY,**  
NEW YORK,  
MANUFACTURERS OF  
**TOOL CHESTS**

Of all sizes, complete with tools, for Hardware, Toy,  
Notion and Variety trades.  
Factory and Salesroom,

200 West Houston Street, near Varick.  
Also Machinists' Tool Chests, empty. Illustrated Cata-  
logue and prices furnished on application.

**F. S. HUTCHINSON CO.,**  
Paragon Self-Retaining Dumb Waiters,  
HAND AND BELT POWER ELEVATORS,  
Aldrich Building, 32 Warren Street,  
NEW YORK.

**CATALOGUES AND QUOTATIONS**  
Our System for Filing is the Simplest  
and Most Complete. Write for De-  
scriptive Matter, Price-List and  
Testimonials.

The Folding Paper Box Co.,  
SOUTH BEND, INDIANA.  
We make all kinds of Paper Boxes, Cartons, Fold-  
ing Boxes and Regular Work.

**THOMAS CLARKE**  
**HARDWARE AND GENERAL AGENT.**  
(FIRST-CLASS REFERENCES.)  
60 PRINCE WILLIAM ST., ST. JOHN,  
NEW BRUNSWICK.

**EMBOSSING...  
PAYS**

If you use it on your Catalog  
Covers. We design and print  
Modern Catalogs. Send for  
our latest.

**GRIFFITH, AXTELL & CADY CO.**

Printers and Embossers, HOLYOKE, MASS.

**Boxes Made Absolutely Secure**  
BY USING THE PORTABLE  
**BOX BANDER**  
ONE MAN CAN BAND  
YOUR BOXES QUICKER THAN TWO  
MEN CAN IN ANY OTHER WAY.  
HOOP IRON WIRE OR ANY OTHER FLEXIBLE MATERIAL  
CAN BE USED EQUALLY WELL. Send for price  
SOON PAYS FOR ITSELF. J. W. GOODSELL - BURLINGTON, VT.

ESTABLISHED 1816.

**WHITE, VAN GLAHN & CO.,**  
CHATHAM SQUARE, NEW YORK,  
**HARDWARE JOBBERS.**

Carry a full line of

Lowentraut's Skates,

Coal Hods, Elbows, Stove Boards,

and all Seasonable Goods.

WRITE FOR PRICES.

SOLE U. S. AGENTS FOR

**J. B. Addis Wood Carvers' Tools.**

SHARP TOOLS are a NECESSITY to a good workman,

But without a GOOD WHETSTONE they are an impossibility.

That is why it is always economy to buy

**PIKE'S WHETSTONES.**

Pike's Indian Pond Scythe Stone, Strong, Sharp  
Grit, Quick Cutting.

Scythe Stones.

Oil and Water Stones.

GREEN MOUNTAIN,  
LAMOILLE  
BLACK DIAMOND,  
PREM. QUINNEBAUG,  
WHITE MOUNTAIN,  
GENUINE RAGG,  
WILLOUGHBY LAKE.

WASHITA,  
ARKANSAS,  
HINDOSTAN,  
WATER-OF-AYR,  
RAZOR HONES,  
TABLE HONES,  
AXE STONES, ETC.

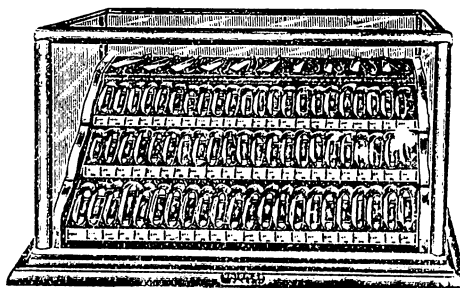
**THE PIKE MFG. CO., - Pike Station, N. H.**

**"DEMPSEY" CUTLERY**

**DISPLAY CASE.**

Convenient, Attractive, Clean. Saves  
Time and Money. Increases Sales.  
Preserves and Protects Stock.

We will be pleased to ship through  
your jobber.



Patented October 3d, 1893.

FOR FURTHER INFORMATION, CIRCULARS AND PRICES, ADDRESS

**UNION SHOW CASE COMPANY, Chicago, Ill.**

The Following Leading Firms are Authorized Agents:

Horton, Gilmore, McWilliams & Co., Chicago, Ill.  
Dane, Stoddard, Kendall & Co., Boston, Mass.  
F. A. Koch & Co., New York, N. Y.  
A. R. Justice & Co., Philadelphia, Pa.  
Henry Keidell & Co., Baltimore, Md.  
The Wm. Bingham Co., Cleveland, Ohio.  
Speer Hardware Co., Port Smith, Ark.  
Dixon, Bergeson & Co., Portland, Oregon.  
Henry Sears & Co., Chicago, Ill.  
John Pritzlaff Hdw. Co., Milwaukee, Wis.  
Farwell, Ozmun, Kirk & Co., St. Paul, Minn.  
Fletcher Hardware Co., Detroit, Mich.  
Baker & Hamilton Hardware Co., San Francisco, Cal.

Kirkpatrick Hardware Co., Atlanta, Ga.  
W. C. Belknap & Co., Louisville, Ky.  
A. F. Shapleigh Hdw. Co., St. Louis, Mo.  
The Wyeth Hardware & Mfg. Co., St. Joseph, Mo.  
Rogers & Baldwin Hdw. Co., Springfield, Mo.  
McGregor-Noe Hdw. Co., Springfield, Mo.  
Wells & Nelegar Co., Chicago, Ill.  
Wadsworth & Matheson, Jacksonville, Ill.  
Van Camp Hardware & Iron Co., Indianapolis, Ind.  
The Way Hardware Co., Hartford, Conn.  
Alfred Ely & Co., Baltimore, Md.  
E. F. W. Meier, St. Louis, Mo.

"Stamped with the BUCK'S HEAD."



## BUCK BROTHERS, MILLBURY, MASS.

The Most Complete Assortment in the U. S. of  
Shank, Socket Firmer and Socket Framing  
Chisels, Fine Bevel Edge Chisels, Plane Irons.

## TWO PRIZE MEDALS,

No. 1098 and No. 1099, AT WORLD'S FAIR.

Buyers are cautioned against any parties who claim a recent connection (or any connection for over 20 years) with Buck Bros., or who represent goods as our make not stamped with the BUCK'S HEAD or BUCK BROTHERS in full.

ESTABLISHED, 1825.

**R. HEINISCH'S SONS CO., NEWARK, N. J.**

INCORPORATED, 1892.

New York Office, No. 90 Chambers Street.



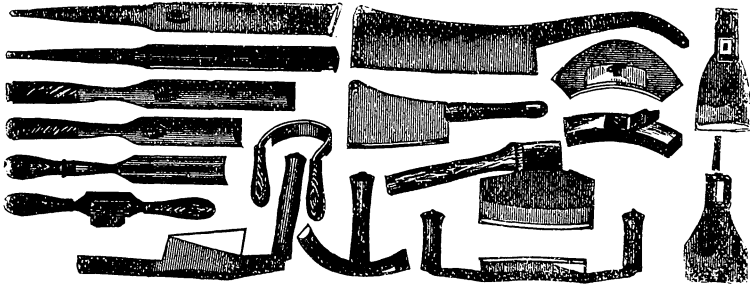
Tailors' Shears, Trimmers, Scissors,  
Tinnern's Snips, &c.

CATALOGUES AND PRICES ON APPLICATION.

We have no contract with Messrs. Hermann Boker & Co. as Agents for the sale of our goods.

HIGHEST AWARD PARIS EXPOSITION, 1889.

ESTABLISHED 1837  
INCORPORATED 1892.



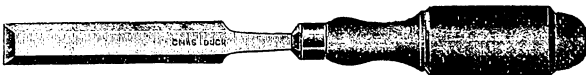
**THE L. & I. J. WHITE CO.,**  
BUFFALO, N. Y.

MANUFACTURERS  
OF  
**EDGE TOOLS.**  
Coopers', Carpenters' and Ship Tools, Plane Irons,  
Cleavers, &c. Full Line Chisels.

1853

1894

Highest Awards at the World's Exposition for Superior Tools.



## CHARLES BUCK,

sole surviving member of the original firm of BUCK BROS., and proprietor of the  
**MILLBURY EDGE TOOL WORKS, MILLBURY, MASS.**

Manufacturer of the

**GENUINE STANDARD BUCK TOOLS.**

All kinds of Shank, Socket Firmer Chisels and Gouges, Cut and Double Irons, S. D. Bits, etc. Send for Catalogue. CAUTION.—Buyers wanting the standard Buck Tools will see that they get only those stamped CHARLES BUCK when ordering from the jobbing houses. Address all correspondence to CHARLES BUCK or the

Millbury Edge Tool Works, Millbury, Mass.

FINEST CAST STEEL

# RAZORS

Trade-Mark "Charles Buck."

**GUARANTEED HAND FORGED AND HAND GROUND.**

Any Style or Brand made to order. Facilities "up to date."  
Razor Handles, all sizes and styles in stock.

**MILLBURY RAZOR CO., Millbury, Mass.**

JOSEPH BOOTH, Treas.

PRICES ON APPLICATION.

THOS. SHALES, Secy.

## Cast Shears.

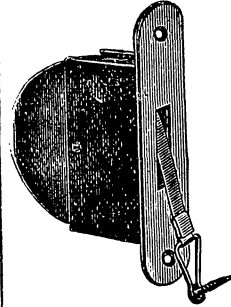
ACME SHEAR CO.,

BRIDGEPORT, - CONN.

## A RECORD BREAKER.

It seems strange when we say that our business is good and the demand for our **STEEL FRAME SASH BALANCE**

grows every day. We know why: because our Balance is perfect in construction and gives general satisfaction. Ask us for prices and don't confuse ours with the cheaper grades of Cast Iron makes.



ASK FOR THE  
"Pullman."

PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.  
Chicago Office, 235 Lake St.

IF YOU WANT THE BEST  
BRITANNIA SPOONS  
SEND TO  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER  
IF NOT SUPERIOR  
TO ANY OTHER  
HADDAM, CONN.  
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST  
NICKEL SILVER SPOONS  
SEND TO  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER  
IF NOT SUPERIOR  
TO ANY OTHER  
HADDAM, CONN.  
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST  
SILVER PLATED SPOONS  
SEND TO  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER  
IF NOT SUPERIOR  
TO ANY OTHER  
HADDAM, CONN.  
HAVE BEEN IN BUSINESS SINCE 1840.

## To Stand the Test



Of hard usage to which it is subjected, the materials—steel—and workmanship, riveting and drop-forging, must in a **Black Hawk Nail Puller** be of the very best. Add to this construction that enables it to perform its work quickly and easily, and you have all that is required. Our puller has all these merits, and is only \$9.00 a dozen, net.

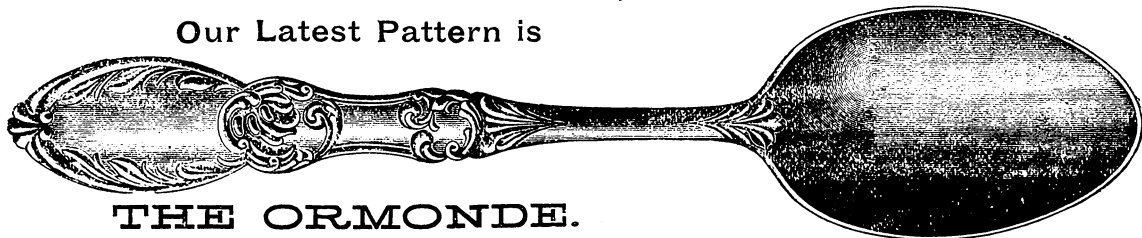
American Specialty Company,  
Hartford, Conn.



# The Leader is the SILVER PLATED WARE.



Our Latest Pattern is



THE ORMONDE.

**WM. ROGERS MFG. CO.,**

Salesroom and Office, Hartford, Conn.

FACTORIES: HARTFORD, CONN., NORWICH, CONN., AND TAUNTON, MASS.

## Quality or Price?

Don't sacrifice quality for price. Don't pay too much for quality. You do neither by buying of us. The name of a reliable manufacturer on goods is worth more than it costs.



Send for  
folders.

Leader Tea Spoon  
FULL SIZE.

**THE HOLMES & EDWARDS SILVER CO.,** - - Bridgeport, Conn

Send for REVISED CATALOGUE. Every wide awake dealer should have it.

**TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.**

NEW YORK

SALESROOM,



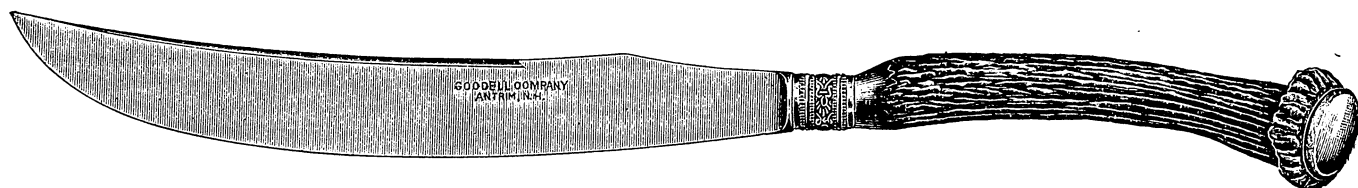
122 Chambers  
Street.

**NORTHAMPTON CUTLERY COMPANY, Manufacturers, Northampton, Mass.**

## You Make a Mistake—

If you delay too long placing orders for

# CARVERS.



Our line of Carvers has been very much increased. Prices are low. Goods second to none in finish, and quality as good as they can be made. If ordered now we can ship promptly. We may be able to do so a month hence. For Butcher Knives and Steels, Table Knives and Forks, Shoe Knives, Butter Spades, Can Openers, Kitchen, Bread, Cigar, Putty, Cheese, Hunting, Sticking, Skinning and Boning Knives, ask for "Goodell's" and get goods you can warrant. Sold by jobbers everywhere.

**GOODSELL COMPANY, - ANTRIM, N. H.**

THE WILLIAMS PRINTING CO.,  
Commercial Printers and Binders

ESTIMATES FURNISHED FOR ALL CLASSES OF WORK.

96, 98, 100 & 102 READE ST

NEW YORK.

**STEEL**

Spiders,  
Griddles,  
Kettles,  
Maslins,  
Scotch Bowls,  
Stew Pots,  
Stew Pans,  
Etc.,

Will Not Warp.

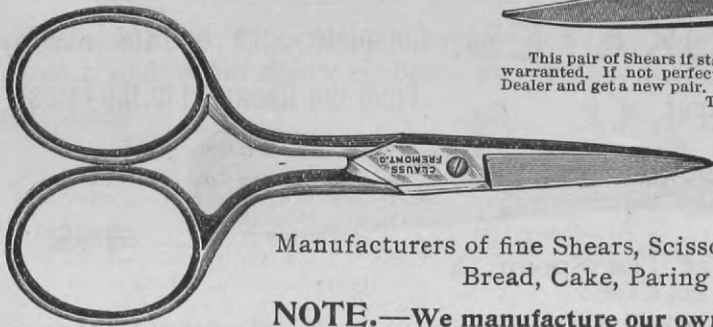
**ATTENTION.**

Quick Shipments.  
Complete Line.  
Perfect Goods.  
No Delays.

The Avery Stamping Co.,  
Cleveland, O.

**Clauss**

Fremont, O.



This pair of Shears if stamped "Clauss, Fremont, O." is fully warranted. If not perfectly satisfactory return them to your Dealer and get a new pair.

THE CLAUSS SHEAR CO., Fremont, O.

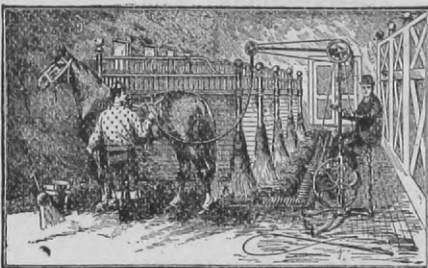
**THE CLAUSS SHEAR CO.,**  
Fremont, O., U. S. A.,

New York Office, 100 Chambers Street,

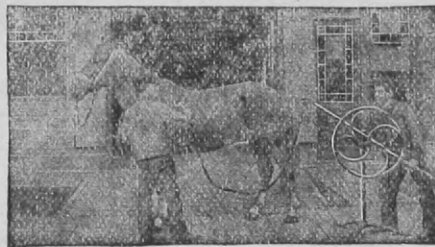
Manufacturers of fine Shears, Scissors, Tinnery Snips and The Celebrated Clauss  
Bread, Cake, Paring and the Perfect Carving Knives.

NOTE.—We manufacture our own Scissors.

**First Prize, Highest Medal of Award, World's Fair, Chicago, Ill., 1893.**



THE CYCLONE CLIPPER.



GILLETTE'S CELEBRATED HAND POWER MACHINE.



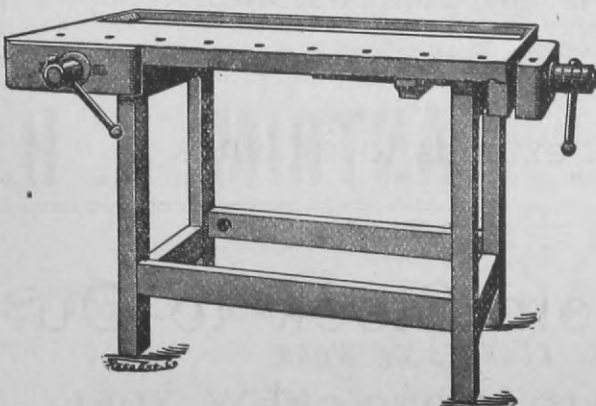
"YOKE" CLIPPING MACHINE. OPERATED BY ANY KIND OF POWER.

**HEADQUARTERS FOR HORSE CLIPPING MACHINES.**

Greatest Variety of Power Horse Clipping Machines in the World.

Over 2,700 in use—over 200 in New York City in constant operation. Introduced in the leading Horse Car Stables, Express Companies, Breweries, Dry Goods Houses, &c., in the United States and foreign countries. Send for Catalogue illustrating our machines, prices, &c., just out.

**GILLETTE CLIPPING MACHINE CO.,** 201 East 23d Street, New York.



## Youths' Cabinet Bench

FOR HOLIDAY TRADE.

A popular idea for parents is to cultivate the mechanical ambition of their boys. This Bench is similar to a regular Cabinet Makers' Bench, but smaller. Length over all, 4½ ft., width 20 inches, with 13-inch glued up top and fitted with head and tail vises.

Dealers sold a great many last year for the holiday trade.

WRITE FOR PRICES.

**G. R. HAND SCREW CO., GRAND RAPIDS, MICH.**

# WINSLOW'S ICE SKATES.

ALL STYLES CARRIED IN STOCK. PROMPT SHIPMENTS

AT LOWEST PRICES.

—SEND FOR CATALOGUE.—

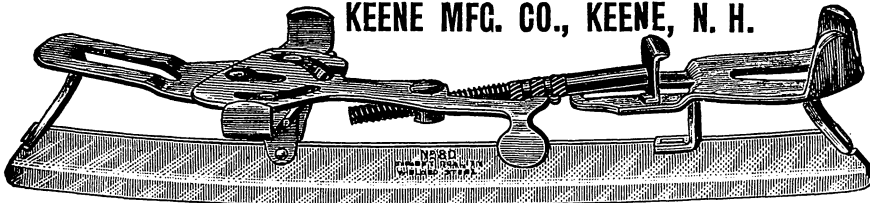
## DAME, STODDARD & KENDALL,

SELLING AGENTS.

374 Washington Street, - BOSTON, MASS.

**LONG REACH ICE SKATES.** Complete Line of Ice Skates,  
From the Cheapest to the Finest.

MANUFACTURED BY  
KEENE MFG. CO., KEENE, N. H.



BIGELOW & DOWSE CO., General Agents,  
229 FRANKLIN STREET, - BOSTON, MASS.  
SEND FOR 1894 CATALOGUE.

—AGENTS.—

Supplee Hardware Co., Philadelphia, Pa.  
McIntosh - Huntington Co., Cleveland,  
Ohio.

A. F. Shapleigh Hdw. Co., St. Louis, Mo.  
Smith, Lyon & Field, New York, N. Y.  
The Henry Sears Co., Chicago, Ill.  
Farwell, Ozmun, Kirk & Co., St. Paul,  
Minn.

Standart Bros., Detroit, Mich.  
Jay A. Rickard, Schenectady, N. Y.  
Weed & Co., Buffalo, N. Y.



Established 1856.

Incorporated 1886.



We sell more Skates than any other makers.

We make better Skates than any other makers.

Our line of Skates is more complete than any  
other made.

We never work off Job Lots on our customers.

Our line of Skates is without an equal.

Their reputation as the best extends to all lands.

Prompt Shipments from Stock to Our  
Customers Guaranteed.

**WE ARE AGENTS FOR:**

Wm. Jessop & Sons' Cast Steel.  
 Washburn & Moen Mfg. Co.'s Wire Rope.  
 Boston Belting Co.'s Rubber Goods.  
 Alexander Bros.' Oak Tanned Belting.  
 Jarecki Mfg. Co.'s Steam Fittings, &c.  
 Peet Valve Co.'s Valves.  
 Ericsson Hot Air Pumping Engines.  
 The Samuel Winslow Skate Mfg. Co.'s Ice Skates.  
 Chicago Emery Wheels.  
 Black Diamond Files.  
 Russell & Erwin's Screws.  
 P. & F. Corbins Builders' Hardware.  
 Landers, Frary & Clark's Table Cutlery.  
 Geneva Tool Co.'s Agricultural Tools.

Write us for Prices.

**THE W. BINGHAM CO.,** 146, 148 & 150 Water St., Cleveland, Ohio.  
 97 & 99 Superior St.,

**THE CRAWFORD MFG. CO.**

MAKERS OF

HIGH GRADE AND JUVENILE

**BICYCLES,**

FACTORY, HAGERSTOWN, MD.

NEW YORK OFFICE, 72 READE STREET. L. B. Whympier, Mgr.

DIRECTIONS FOR USING

**WILLIAMSON'S NEW POWER CORK SCREWS.****KEEP ON TURNING, DO NOT PULL.**

No. 1249, Nickel Plated, Apple Wood Handle, \$5.00 per dozen.  
 " 1443, " Rosewood " 6.50 " " "

For Discounts and Prices of other styles send for Catalogue.

**G. T. WILLIAMSON WIRE NOVELTY CO., NEWARK, N. J.**

Manufacturers of Wire Specialties for the Trade

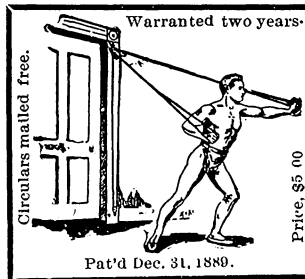
**THE NEW "PROTECTOR" REVOLVER**

A 7-SHOT, 32 CALIBRE, STANDARD CARTRIDGES.

SEND FOR  
CATALOGUE.

**QUICK! DURABLE!**  
**COMPACT! EFFECTIVE!**

The most Genteel and Serviceable  
 Rapid Firing Revolver ever manufactured.  
 Carried in the vest pocket as easily as a  
 watch. Absolutely Safe! Automatic  
 Safety Lock! An Ideal Weapon for a  
 man to carry. Selling by the Thousand.  
 Elegantly Finished, Neatly Packed in a  
 Box, Price \$6.00. Ask your Dealer for  
 them or send to us.

**CHICAGO FIRE ARMS CO., 637-638 Monadnock Building, CHICAGO, ILL.****THE WHITELY EXERCISER**

Warranted two years.

Circulars mailed free.

Price, \$5 00  
 "Health and Strength," 64 pages,  
 illustrated. Mailed for 10c.

Pat'd Dec. 31, 1880.

A Complete Home Gymnasium

MADE OF ELASTIC CORD RUNNING OVER

**NOISELESS CONE BEARING PULLEYS**

RESISTANCE SELF ADJUSTING.

RECOMMENDED BY ALL PHYSICIANS.

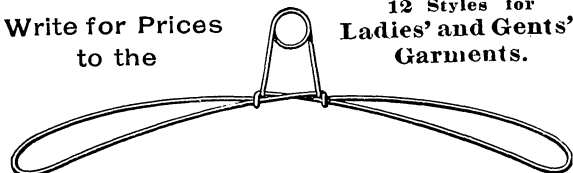
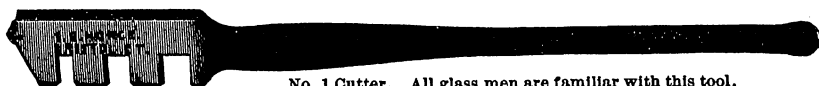
DEMAND CREATED BY THE MANUFACTURERS.

Liberal Discount to Dealers.

— MANUFACTURED ONLY BY —

**THE INDEPENDENT ELECTRIC CO., 39th St. and Stewart Ave., CHICAGO, U. S. A.**Write for Prices  
to the

12 Styles for  
 Ladies' and Gents' "Wire  
 Hangers."

**Barber-Koenig Mfg. Co., No. 119 NORTH VINE ST., HAZLETON, PA****MONCE'S NOVELTY GLASS CUTTERS. — INTERCHANGEABLE LOCK STENCIL**

No. 1 Cutter. All glass men are familiar with this tool.

**S. G. MONCE, BRISTOL, CONN.**

DO YOU AIM

**To Make a Bull's Eye**

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a  
 Rifle, Pistol or Shot Gun, you will make a HIT by  
 sending for the IDEAL HAND BOOK.

**IDEAL MFG. CO., New Haven, Ct., U. S. A.**Please mention *The Iron Age* when you write.**Buy Direct**

From us, if you want a  
 bicycle "Built for Business," and sold at a legitimate profit. We want the  
 best trade or none. We want  
 dealers that will buy

**From the Maker**

In large or small quantities, with your name or  
 ours. We are not ashamed of our productions.  
 Any responsible dealer, who orders a sample  
 New Clipper, and does not consider it worth the  
 price we ask, may return it

AT OUR EXPENSE.

**New Clippers**

Are Built to Create Business.  
 Are Built to Please Business men  
 Who Buy for Business,  
 Ride for Business,  
 Sell for Business, and  
 Who are in Business for Business.

**Grand Rapids Cycle Co.,**

B ST., GRAND RAPIDS, MICH.

**SKATE GRINDING MACHINERY.**

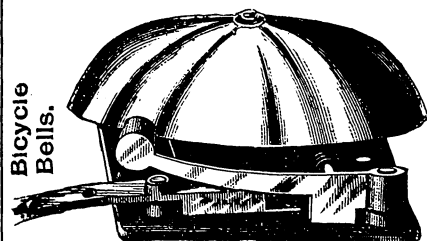
A complete line. Write for prices of the

**Keenedge Skate Grinder**

and Skate Holder.

Charles Perkins, - Bridgewater, Mass.

Special discount to the Hardware Trade.

Bicycle  
Bells.

BEVIN BROS. MFG. CO., Easthampton, Conn.,

Manufacturers of

Sleigh Bells, House Tea Hand, Gong Bells., &amp;c.

**HOW TO KEEP A STORE**

BY S. H. TERRY.

406 PAGES, 5 x 7 1/4 INCHES.

POST-PAID, \$1.50.

Among the subjects discussed are: The selection  
 of a business; choice of a locality; buying a  
 stock of goods examining, marking and ar-  
 ranging goods; how to advertise; employ-  
 ment of clerks; selling for cash and credit;  
 keeping accounts; expenses; copartnerships;  
 losses by fire, theft, &c.; influences of social  
 life on business; buying at auction; invest-  
 ment of profits; insolvency; business qual-  
 ifications

**DAVID WILLIAMS, Publisher & Bookseller,**

96 - 102 Reade St., New York.



Steel Spiders, Griddles, Kettles, Maslins, Scotch Bowls, etc. Send for Catalogue and Discounts.

## "NEVER-BREAK" Steelware.

The "STANDARD" for Weight, Finish and Price.

Our facilities are such that we can make immediate shipments.

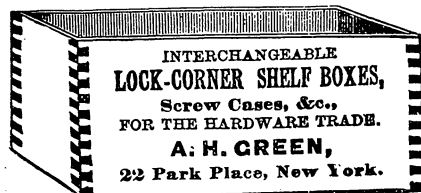
"NEVER-BREAK" Spiders and Griddles are all made of 14 Stubbs' English Gauge and all "NEVER-BREAK" Kettles and other deep ware of 16 Stubbs' English Gauge. These are the only gauges recognized by the United States Government and the trade as "Standard."

**THE BRONSON SUPPLY CO.,**  
NEW YORK AND CLEVELAND.

— REMEMBER —  
WE MAKE ONLY

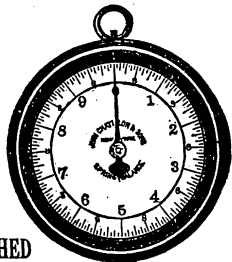
The Very Highest Grade  
OF  
**MECHANICS' TOOLS.**

M. H. MAYHEW CO., Shelburne Falls, Mass.



**John Chatillon & Sons,**

85, 87, 89, 91, 93 CLIFF ST., NEW YORK

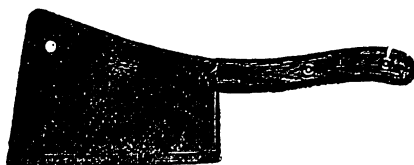


ESTABLISHED  
1835.

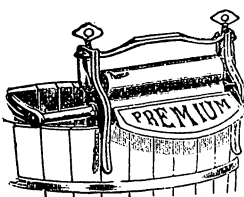
SEND FOR  
PRICE-LIST.



Sole Agents for  
**Foster Bros.' Butchers' Cutlery.**



**John Chatillon & Sons, N. Y.**



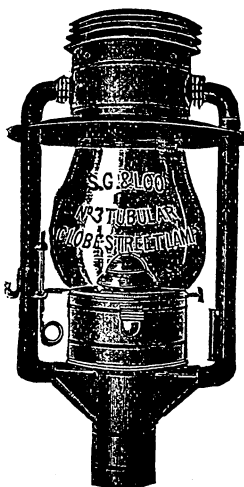
**COLBY WRINGER CO., - Montpelier, Vt.**

MANUFACTURERS OF THE

**Premium Wringer,**

With Automatic Apron Adjustment.

SURPLESS, DUNN & ALDER, Direct Representatives,  
15 Murray Street, New York.



No. 3

Globe Street Lamp.

Light your Streets and Driveways.

The S. G. & L. CO.

## Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.  
Equal to the best Gas Light.  
Will not Blow Out in the Strongest Wind.  
Will not Smoke.  
Will not Freeze.  
Automatic Extinguisher.  
Outside Wick Regulator.  
Will Burn Four Hours for One Cent.

MANUFACTURED BY

**STEAM GAUGE AND LANTERN CO.,**

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.

## LIGHT YOUR DARK SHOPS CHEAPLY.

Give your men plenty of Light and they will do double work.

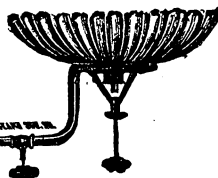


The Wall Torch has been used for several years as a means of illumination in Mills, Foundries, Machine and Car Shops, Tunnels, Street Stands, Band Stands, Smith Shops, etc.

While there are many cheap, inferior torches made which injure the sale of a good article, and condemn the Torch in general, our "Incandescent" Wall Torches are recognized as the best, and are now in use in the largest manufacturing establishments in the country giving PERFECT SATISFACTION, as is evidenced by the DUPLICATE ORDERS we receive from year to year.

They burn 150° Coal Oil, or 74° Naphtha, requiring a different burner for each.

In ordering be careful to state which is desired.



Price, for Single Torch, complete, \$2 each.

SPECIAL PRICE QUOTED FOR QUANTITIES.

**THE STANDARD LIGHTING CO.,**

100 to 118 Perkins Ave., - - - Cleveland, Ohio,

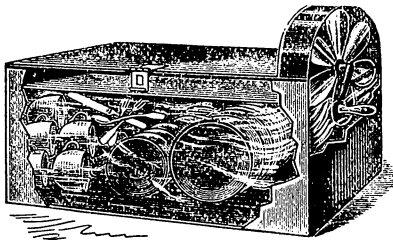
## BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.



# NEW 1895 HOUSEHOLD SPECIALTIES.

ILLUSTRATED CATALOGUE WITH DISCOUNTS NOW READY.

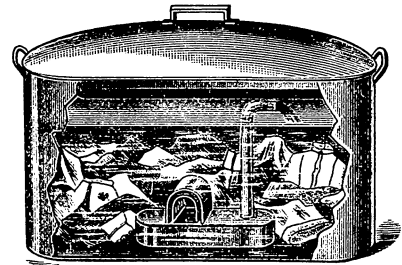


One-Minute Dish Washers.

Gas Soldering Iron, - \$2.  
Soldering without a Stove. Iron always hot.

Gas Kitchen Iron, \$2.  
One Iron does all the work without a Stove.

Gas Heating Stoves,  
Save 4-5 the cost of Gas. Heat intense.  
No. 1, \$5; No. 2, \$7.50;  
No. 3, \$10.



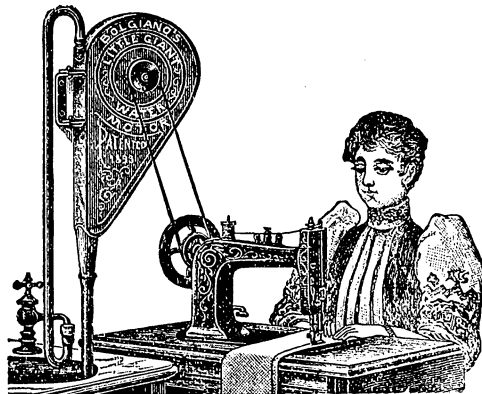
Steam Clothes Washer.

Gas Cooking Stoves,  
The most perfect and even Cooker in the World.  
1 Burner \$1; 2 B., \$1.50; 3 B., \$2.

Clothes Washers, 50c.  
Washes without scrubbing in 15 minutes.

Our Irons and Stoves Save 80 % of Gas.

Water Motors, No. 1, \$5; No. 2, \$10;  
No. 3, \$15.  
For Sewing Machines, Fans, Dental Engines, and other light machinery,  
Fans, Printing Presses, Grindstones, Coffee Mills, Washing Machines, &c.,



Little Giant Water Motor No. 1.

Dish Washers, - \$3.  
Washes dishes in one minute, family, restaurant or hotel.

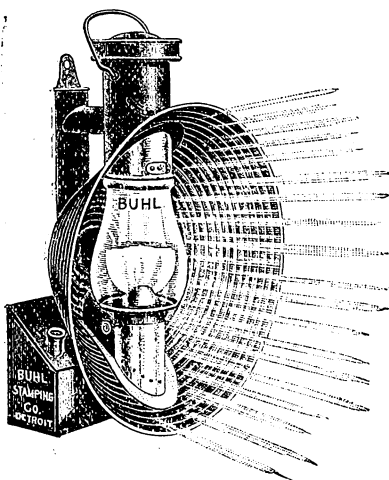
Kitchen Odor Consumer,  
\$1.  
Consumes all the Odor of the Kitchen while Cooking.

Dough Mixer, - \$2.  
Mixes dough in 1-3 time, family, bakers and hotels.

The Belgiano Mfg. Co.,  
BALTIMORE, MARYLAND.



Bolgiano's Perfection Hot Air Gas Iron.



We can fill orders on the day they are received for

## BUHL TUBULAR HEADLIGHTS

No. 15 New Side Lift Lanterns.  
No. 20 Buhl Top " "  
No. 200 " " "

The Celebrated Buhl Dash Reflector Lanterns.

Every Buhl Lantern is tested before it leaves our factory. Construction and quality guaranteed. Send for our complete illustrated catalogue.

Buhl Stamping Co., Detroit, Mich.

## SICKELS, SWEET & LYON,

Wholesale Hardware and Farming Tools.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

NEW YORK AGENTS FOR

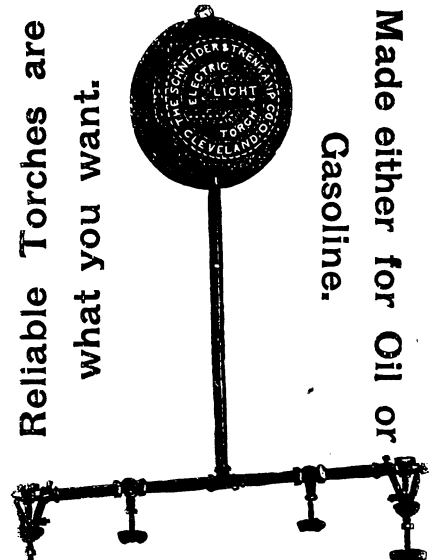
Winslow Skate Mfg. Co.

Union Steel Screw Co.

Eagle File Co.

American Shear Co. Knives.

Fall Catalogue No. 8 issued early in September.



Reliable Torches are what you want.

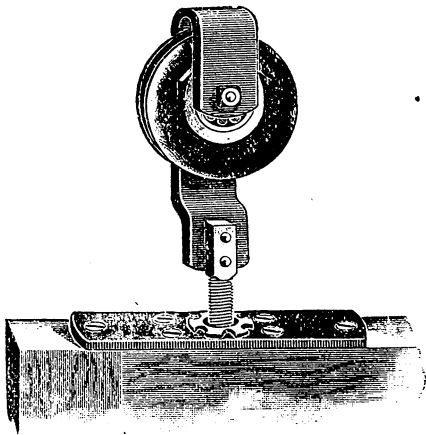
Made either for Oil or Gasoline.

These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

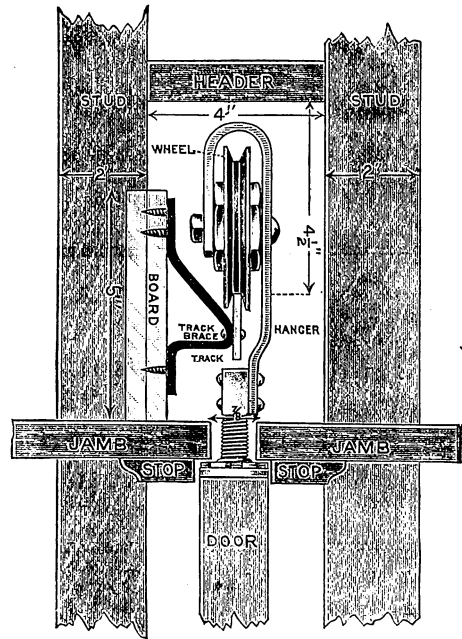
Write us for prices. A liberal discount given to the trade. Manufactured by THE SCHNEIDER & TRENKAMP CO. Nos. 479 to 497 Case Ave., Cleveland, Ohio.

Hicks' Builders' Guide.—Comprising an easy practical system of estimating material and labor for carpenters, contractors and builders. A comprehensive guide to those engaged in the various branches of the building trades. By I. P. Hicks; illustrated by numerous engravings of original drawings. 180 pages; cloth \$1.00 For Sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.

# Lane's New Model Patent Steel Parlor Door Hanger.



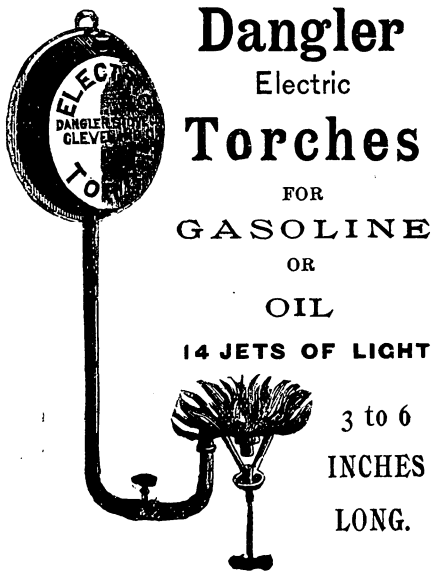
IS MADE ENTIRELY OF STEEL, AND ALL  
PARTS TINNED.



Sole Agents,

JOHN H. GRAHAM & CO., 113 Chambers Street, New York.

P. O. Box 1042.

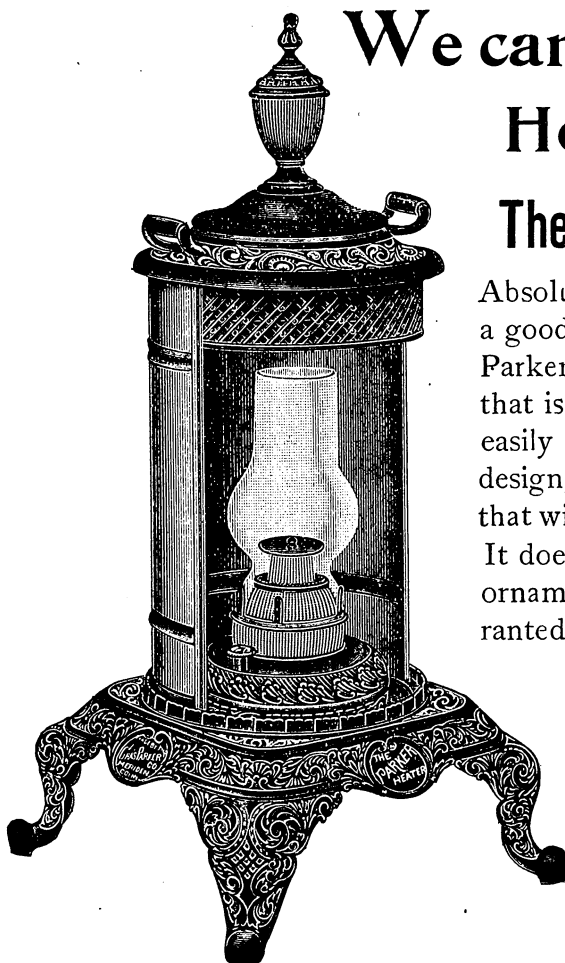


FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

**The Dangler Stove & Mfg. Co.,**  
Cleveland, Ohio.

**THEO. V. SMITH,** Manufacturer,  
54 John Street, New York.  
Stationers' Tin Goods, i. e., Tin Boxes, Etc.  
Hardwood Air Tight Cabinets for Cigars.  
Jewelry and Games.  
Wood Turnings and Enameling.  
Baking Japans.  
Jobbing, Japanning and Tin Shop.  
Special work to order quick.



We can make it  
Hot for you!  
The Parker Heater.

Absolutely safe. If you want a good Heater to sell, buy the Parker. If you want a Heater that is simple in construction, easily operated and of artistic design, if you want a Heater that will *heat, buy the Parker.*

It does the business and is an ornament to any room. War-  
ranted in every respect.

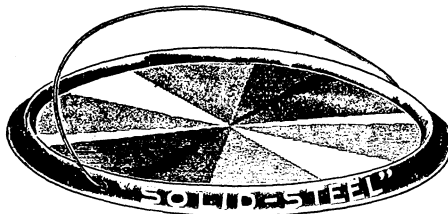
**The Charles Parker Co.,**  
Meriden, Conn.®

New York Salesroom: :

1197 Chambers St.

# WE MAKE

SPIDERS,  
GRIDDLES,  
KETTLES,  
SCOTCH BOWLS,  
MASLINS,  
STEW PANS,  
STEW POTS,  
BROILERS,  
&c., &c.



**THE CLEVELAND STAMPING & TOOL CO.,**  
CLEVELAND, OHIO.

Light and Heavy Stamping and Blanking, Dies and Presses.

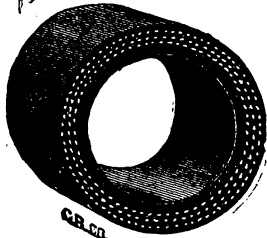
**"SOLID-STEEL"** Spiders,  
Griddles, and Broilers are  
pressed *HOT* from 14 Stubbs'  
Gauge Steel and guaranteed  
not to warp.



This is a fac-simile of the label on my **VULCAN TOOL CO.** brand of **HATCHETS**; a brand for which I have a regular trade in some sections, but to those who have not "caught on"—dealers who are handling an outside brand—I offer a limited quantity at a very low price. Inquiries for price solicited.

**FAYETTE R. PLUMB, Philadelphia.**

NEW SEAMLESS TUBE



**SALES OF**  
**Over Two Million Feet**

—OF—  
**GARDEN HOSE**

alone during the past year,  
distributed throughout  
the United States, and not a  
single piece complained of,  
justifies us in guaran-  
teeing that it will give absolute  
satisfaction.

## Who Has Not Had Bad Hose?

Who has not lost time, patience, money, by attempting settlement for such goods?

**THE CAUSE** in nine cases out of ten is the lapped seam.  
**THE REMEDY** is in buying our

### PATENT SEAMLESS TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.

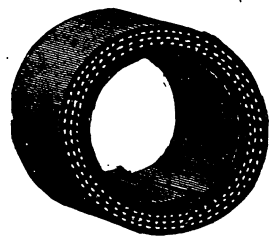
Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

## CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.,  
CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

OLD LAPPED TUBE



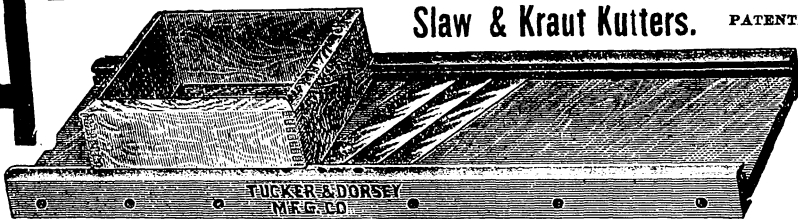
We were awarded an order for  
25,000 ft. for World's Fair  
of our celebrated

**Seamless-Tube**  
COTTON RUBBER-LINED HOSE

**We Want Your Trade.**  
Send for 60-page Catalogue.  
Write for Prices and Samples.

## ADJUSTABLE ♣ KNIFE

Slaw & Kraut Cutters. **PATENTED.**



A line that leads them all. Get our new prices.  
**Tucker & Dorsey Mfg. Co., Indianapolis, Ind.**

## MERK CHRISTMAS TREE HOLDER!

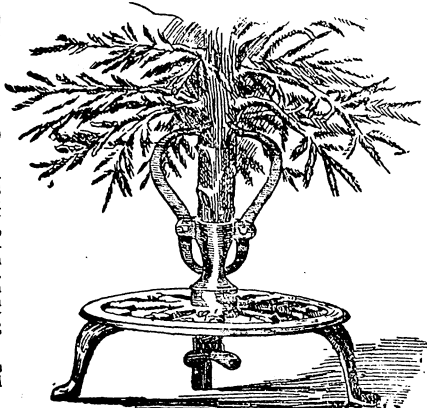
PATENTED SEPT. 1st, 1891.

**BUY THE BEST.**

*Christmas comes but once a year*

If you want to make your home pleasant and cheerful during the holidays BUY A **MERK CHRISTMAS TREE HOLDER**. Made of iron, neatly finished in gold bronze or japanned, a great improvement over any heretofore made. By an ingenious contrivance the tree is held secure by strong arms which extend upward from the main body of the receptacle in which it is placed. If desired the tree can be revolved. Sample tree holders sent by express prepaid upon receipt of \$1. Packed in quarter and half dozen crates for shipment. Manufactured and sold only by the **ALLEN TOWN HARDWARE WORKS, ALLENTOWN, PA.**

**SOMETHING NEW.**—Hardware dealers and others are requested to write for descriptive circulars and wholesale prices.



## The Art of Selling

By **F. B. GODDARD.**

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse and tells how he masters men. But beyond this, the work embraces much information which will be instructive and useful to all classes of business men, discusses fully the characteristic methods of conducting business to-day and makes an interesting application of character reading to the work of business negotiations

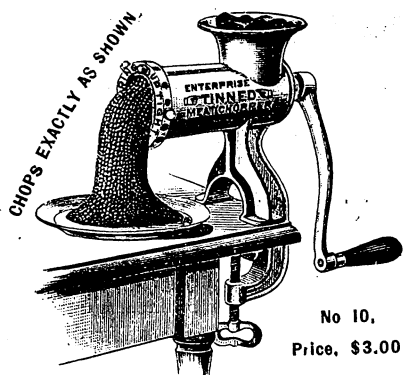
**Price, 50 Cents.**

SENT PREPAID ON RECEIPT OF PRICE BY

**DAVID WILLIAMS,**

Publisher and Bookseller,

96-102 Reade St., New York.

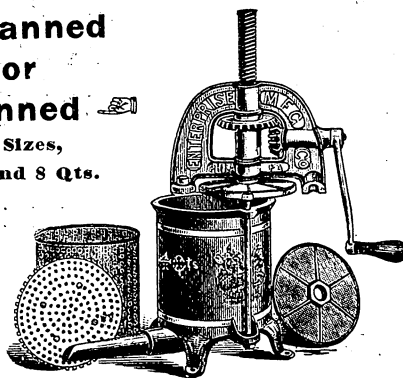
**"ENTERPRISE" MEAT CHOPPER.**

No 10,  
Price, \$3.00.

**TINNED**

**"ENTERPRISE" STUFFER and LARD PRESS.**

**Japanned  
or  
Tinned**  
3 Sizes,  
2, 4 and 8 Qts.



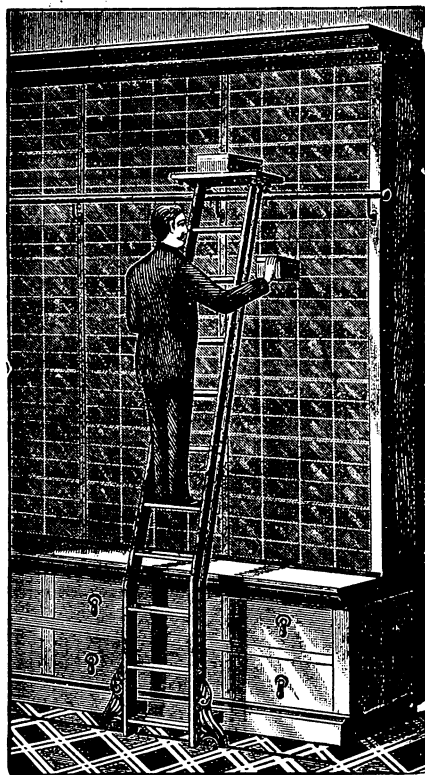
Send for  
**CATALOGUE.**  
**FREE.**

**The Enterprise M'fg Co. of Pa.,**

Third and Dauphin Sts., Philada., Pa.

New York Branch, J. C. McCarty & Co., 97 Chambers St., New York.

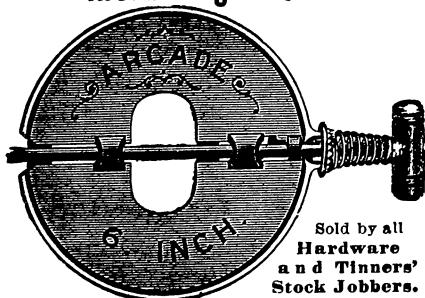
For Sale by the  
**HARDWARE  
TRADE**

**THE BICYCLE STEP LADDER.**  
Especially adapted for Hardware Stores.

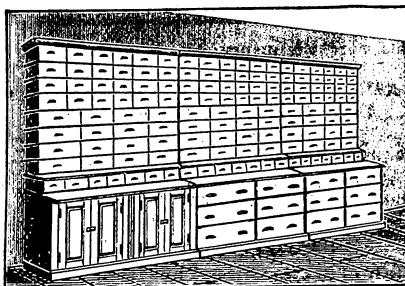
The newest, neatest, simplest, easiest operated and safest store ladder made. Highest Award World's Fair. Write us.

**The Bicycle Step Ladder Co.,** 50 State Street,  
Chicago, Ills.  
N. Y. Agency, E. J. HUSSEY & CO., 80 John St.

Made by **Arcade Mfg. Co.,** Freeport, Ill.



Sold by all  
**Hardware  
and Tinnery  
Stock Jobbers.**

**HARDWARE  
DRAWERS.**

**THE WERNICKE SYSTEM  
OF STORE FIXTURES.**

It is new, novel and unequalled for beauty  
convenience and economy.

Send for Descriptive Circulars.

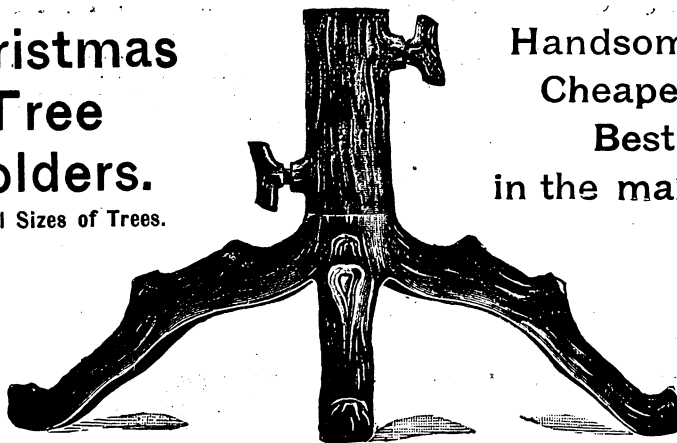
**THE WERNICKE CO.,**

Manufacturers of General Store, Bank and Office Furniture,  
No. 125 WILDER STREET, MINNEAPOLIS, MINN.

**Logan & Strobbridge Iron Co.,**  
NEW BRIGHTON, PA.**Christmas  
Tree  
Holders.**

Fits All Sizes of Trees.

**Handsome,  
Cheapest,  
Best  
in the market.**

**We are Sole Manufacturers of the  
Celebrated Erie and King Wringers.**

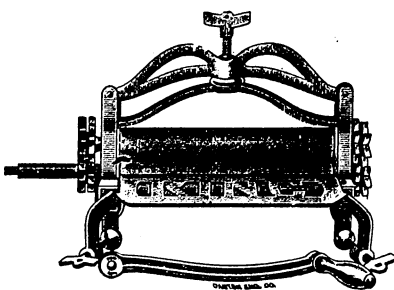
We also make all other brands of Wood and Iron  
Frame Wringers.

Exclusive sale of the **ERIE** and **KING** Wringers  
given to one dealer in each town.

**Write for Catalogue.**

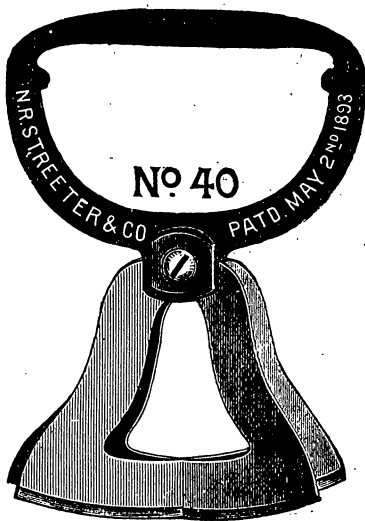
**THE NATIONAL WRINGER CO.,** CANTON, OHIO.

New York Office, 107 Chambers St., John T. Ryan, Mgr



# N. R. STREETER & CO.,

Manufacturers of **SAD IRONS AND HARDWARE.**



## "SENSIBLE" MINCING KNIVES.

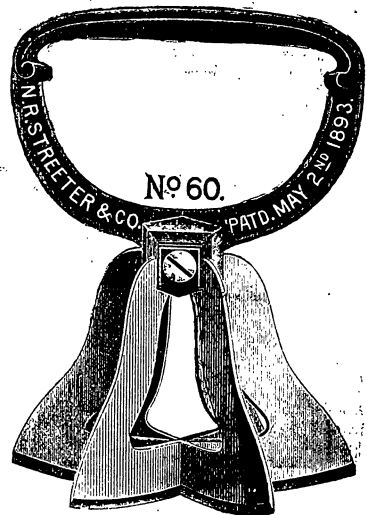
Tempered Steel Nickel-Plated Blades.  
Multiple-Bladed Means Rapid Cutting.

**These goods have become the standard of the market.**

Our line of Sensible Mincing Knives covers all points where other Multiple-Bladed Knives fail.

**BLADES** can be **REMOVED** when they need sharpening. Easy to clean.

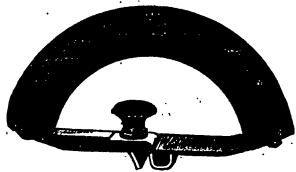
Write for our 1894 Catalogue and get our Prices.



Factories, Rochester, N. Y., Pottstown, Pa.

General Office, Groton, N. Y.

N. Y. Office, W. H. JACOBUS, 90 Chambers St.



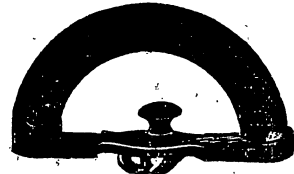
PATENT APPLIED FOR.  
The Steel Stretcher Handle,  
for Mrs. Potts' Sad Irons,  
in Hazel Wood only.  
**No. 110.**

## The Cleveland Wood Turning Co.,

710-726 Scranton Ave., Cleveland, O.

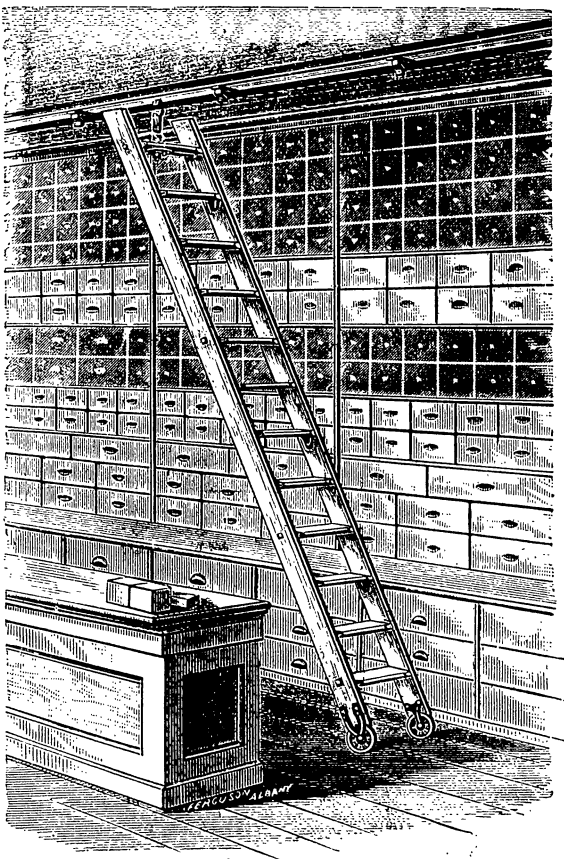
Special work in Handles and Wood Turning of all kinds. Our line of regular made Tool Handles is the best.

New York Office:  
**W. H. JACOBUS,**  
No. 90 Chambers St.



Walnut, Japanned, No. 1.  
Walnut, Tinned, No. 2.  
Hazel, Japanned, No. 10.  
Hazel, Tinned, No. 20.

## THE "NOISELESS" STORE LADDER.



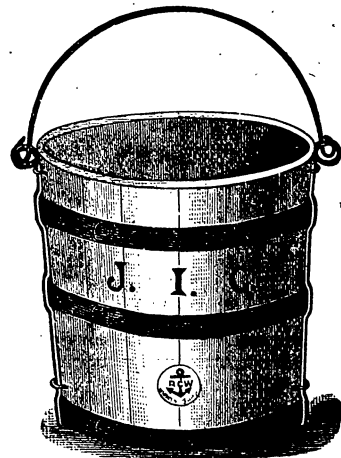
The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

**M. CROISSANT,**

**ALBANY, N. Y.**

## "J. I. C." HORSE PAIL.



Patented August 26, 1886.

Made of Best Seasoned White Oak or Virginia White Cedar.

**SEE THAT STRAP?**

Hoops cannot come off. Best stable, mortar and building pail ever made.

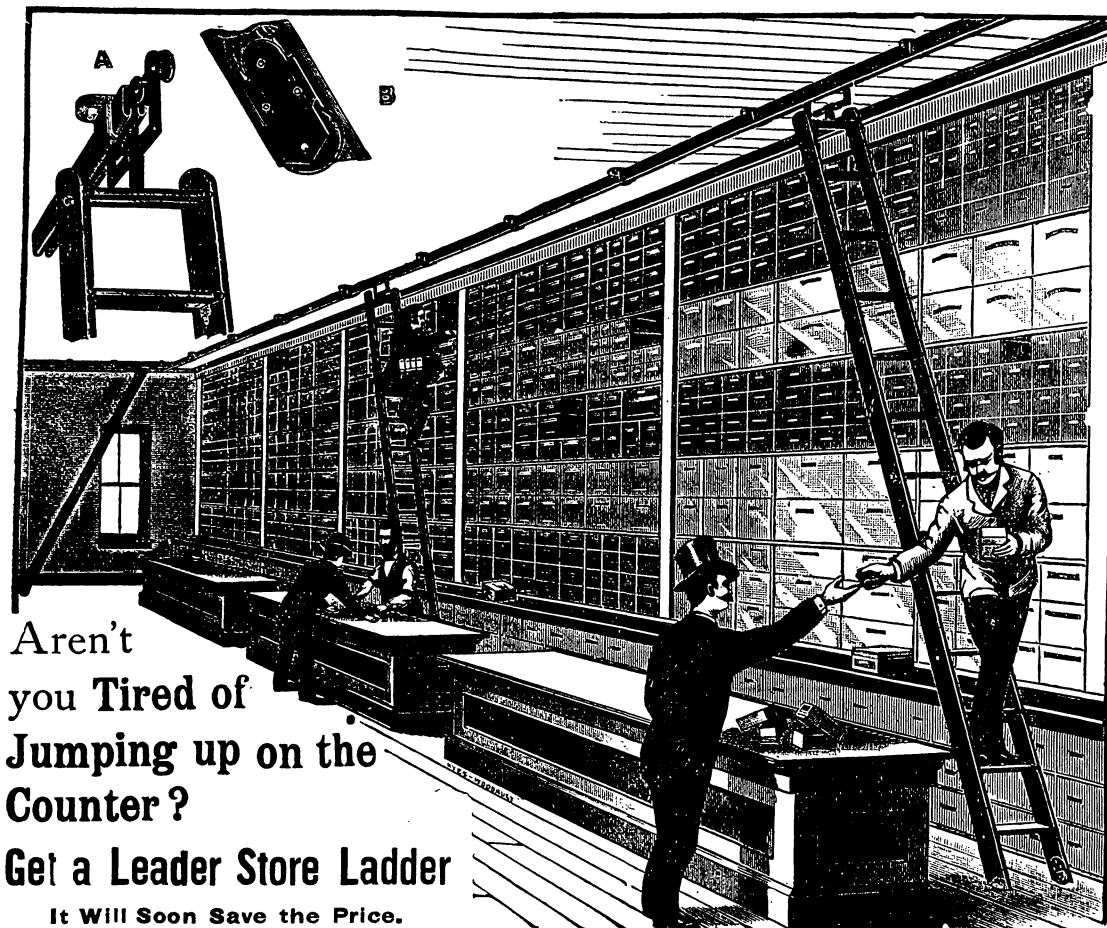
Prices quoted on application.

**RICHMOND CEDAR WORKS,**  
Manufacturers of Woodenware,  
**RICHMOND, VA.**



# THE TROLLEY LEADER STORE LADDER.

See Our Advertisement Next Week.



Parlor, Barn and Fire Door Hangers

Aren't  
you Tired of  
Jumping up on the  
Counter?  
Get a Leader Store Ladder

It Will Soon Save the Price.

**THE COBURN TROLLEY TRACK MFG. CO., - HOLYOKE, MASS.**

New England Agent, L. H. Tourtellotte, No. 94 Pearl St., Boston, Mass.; New York Agents, H. B. Newhall Co., No. 105 Chambers St.; Philadelphia Office, No. 721 Jayne St.; San Francisco Agents, Palace Hardware Co., No. 609 Market St.



We  
are now prepared  
to promptly fill all orders  
for the

**WARNER BURGLAR PROOF LOCKS.**  
The Cheapest, Strongest, Lightest Dead Rim Lock made.  
Write for Prices and Circulars.  
**THE WARNER LOCK CO.,**  
412 Manhattan Bldg.,  
Chicago, Ill.



After five years of extensive use

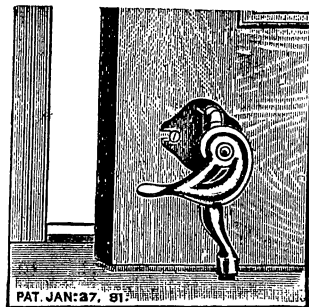
## The Blount Door Check and Spring

is acknowledged generally to be the best on the market. Being free from packing friction, and its interior parts which is a very desirable feature.

The closing and checking power is under direct control and can be quickly adjusted to suit any requirement. They are made in sizes suitable for any doors, and are unequalled in checking power. There are many thousands in use in all the principal cities of the United States, and in other countries. They are recommended by the leading architects everywhere, and once tried are always used. They were awarded a medal for superior merit by the American Institute in New York, 1890, 1891 and 1892, and a silver medal and diploma by the Massachusetts Charitable Mechanic Association, Boston, 1892, and a medal and diploma for superior merit by World's Columbian Exposition, 1893.

**THE STANDARD DOOR STOP OR HOLDER.** A new, novel, and convenient device for holding doors at any angle desired and operated with the foot. It is almost daily required on public and private doors. Send for circular.

**BLOUNT MANUFACTURING CO., - BOSTON, MASS.**



PAT. JAN. 27, 91

IN USE

A practical means of rapidly reaching absolutely accurate results without the mental wear of computing.

**LADD'S DISCOUNT BOOK.**

It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00; Double Indexed Edition, \$4.00.

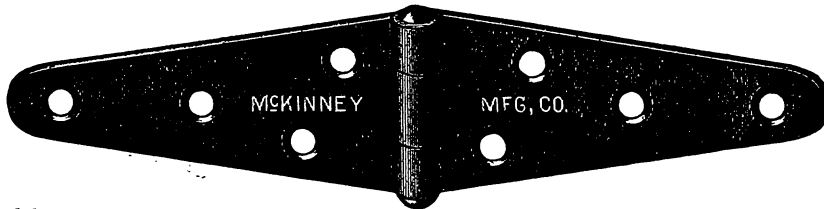
Mailed, postpaid, upon receipt of price by **DAVID WILLIAMS, 98-102 Broadway, New York.**

# STEEL HINGES AND BUTTS.

STANDARD GOODS.

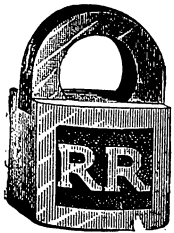
McKINNEY MFG. CO., - ALLEGHENY, PENN.

SEND FOR  
LIST.

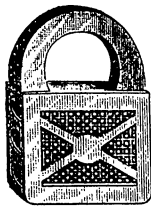


ORDERS FILLED  
ON SIGHT.

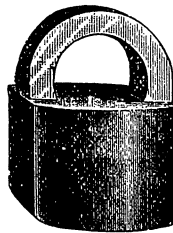
**"NONE BETTER."**



No. 406.



No. 303.



No. 505.

Our goods are the most desirable in every respect. Send for catalogue and prices of our large and complete line.

UNION LOCK & HARDWARE CO., Ltd.,  
LANCASTER, PA.

Ball For Stanley's Steel Butts.

Bearing

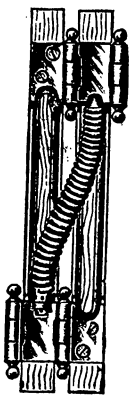


Washers

Doors hung with these Butts require no oiling,  
do not creak, work perfectly.

PRICES ON APPLICATION.

The Stanley Works, New Britain, Conn.  
79 Chambers St., N. Y.



Highest Award, World's  
Columbian Exposition,  
- ON -

**SPRING BUTTS.**

For Catalogue and Prices Address

CHICAGO SPRING BUTT CO.

CHICAGO, ILL.

Or 97 Chambers Street, N. Y.

**Columbian  
Design  
In Iron.**

Antique Copper Plated—hand-  
somest and most durable in-door  
trimmings at a moderate cost in the  
market. Catalogues furnished on  
application.

**Reading  
Hardware  
Company,**

NEW YORK, PHILA., CHICAGO.

Factories, Reading, Pa.

## Ideal Sash Pulley

No. 60-65.

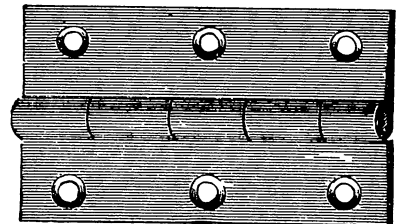
AUGER MORTISE—FACE PLATE.

Made with two inch wheel,  
plain and polished, cone  
axle bearings, noise-  
less and easy run-  
ning; markers on  
the side to lay off  
the centers to bore  
the holes by.

The best and most  
uniformly made low-  
priced Sash pulley  
on the market.

Sample Free.

**STOVER MFG. CO.,**  
145 River St., Freeport, Ill.



## Cast Brass Butt Hinges

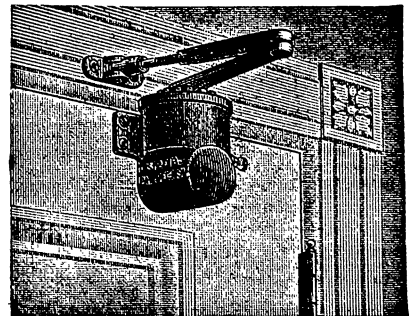
IN STOCK AND FOR SALE BY

**W. & J. TIEBOUT,**

Nos. 16 & 18 Chambers Street, New York.

MANUFACTURERS OF

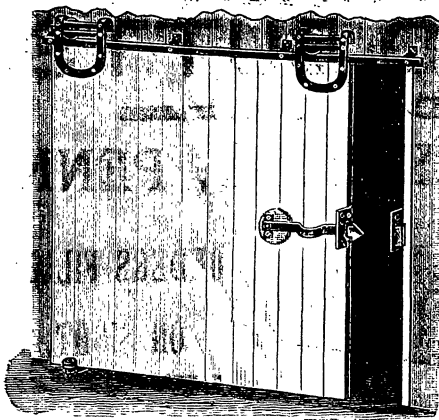
BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.



**Bardsley's Liquid Door Check and Spring.**

Perfect in action, durable, neat in appearance, low  
in price and fully warranted. Responsible Agents  
wanted in the principal cities.

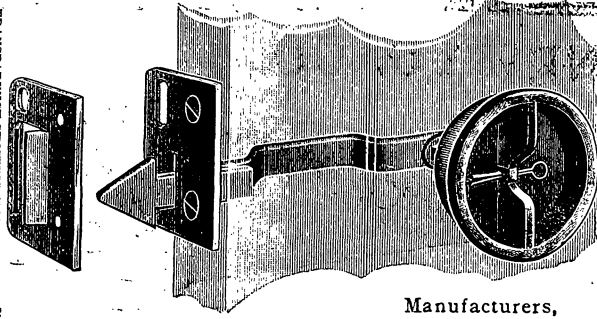
J. BARDSLEY, 149 & 151 Baxter St., New York



## Lane's Pat. Barn Door Hanger. LANE'S SLIDING DOOR LATCH.

We were the originators of this style of Hanger. See that you get the genuine.

TRANSPARENCY SHOWING SIDE NEXT THE PARTITION.



Made of Steel.

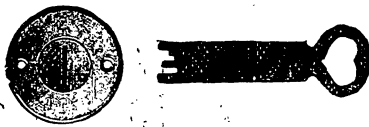
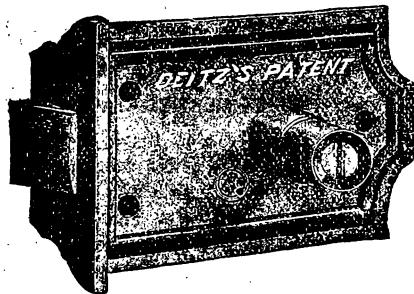
One size only and no right or left. Locks with key if desired.

**LANE BROTHERS,**

Manufacturers,

Poughkeepsie, N. Y.

## A. E. DEITZ



No. 109 Latch.

**J. C. McCARTY & CO., Agents,**  
97 Chambers and 81 Reade Sts., New York.

Factory, **BROOKLYN, E. D., N. Y.**

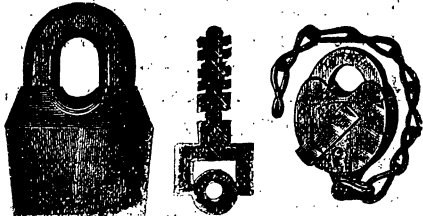
## SASH WEIGHTS

**E. E. BROWN & CO.,**  
McKean and Meadow Sts.,  
**PHILADELPHIA, PA.**

ESTABLISHED 1879.

## KEYSTONE LOCK WORKS.

**E. T. FREAIM, Lancaster, Pa., U. S. A.**



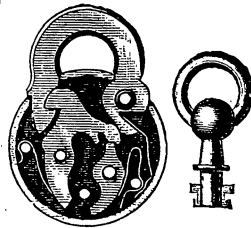
Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

**SUPPLESS, DUNN & ALDER, General Agents,**  
15 Murray St., NEW YORK.

**Coal Mining for the Use of Colliery Managers and others.** By **HERBERT W. HUGHES**. In the preparation of this work the author's aim has been to supply a text-book containing all the information with which the student and the practical miner should be familiar. The details of general colliery work are fully described, and at the end of each chapter is given a carefully selected list of memoirs, in which fuller information can be sought. **CONTENTS:** Geology; Coal; Search for Coal; Breaking Ground; Sinking; Preliminary Operations; Methods of Working; Haulage; Winding; Pumping; Ventilation; Lighting; Works at Surface; Preparation of Coal for Market. 8vo, cloth. \$3.00.

For sale by **DAVID WILLIAMS, 96-102 Reade St. N. Y.**

## Defies Competition for Quality and Price.



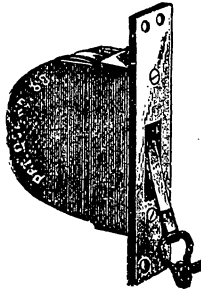
## PATENT PERFECTION PADLOCK.

Eight Tumblers. Key turns both ways

Sizes,  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches, of cast bronze. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{4}$  and  $\frac{1}{2}$  inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

**AMES SWORD CO., Chicopee, Mass.**

Send for Price-Lists and Circulars.



## DOES IT PAY?

To buy an inferior article, which your trade condemns, when you can get

## THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

**CALDWELL MFG. CO., Rochester, N. Y.**



## STAR LOCK WORKS, PHILA.

**W. & L. WOLF,**

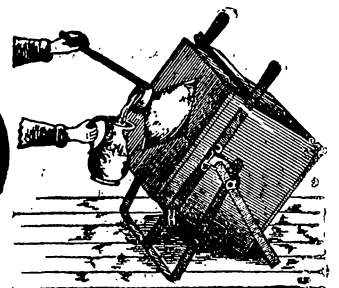
MANUF'RS OF

1st QUALITY ONLY  
**SCANDINAVIAN**

AND

Spring Padlocks,  
Trunk & Case Locks,  
Carboy Stands, &c.

Catalogues Sent on Application.



## WHY USE WOODEN OR HEAVY STEEL BLOCKS

WHEN THE STEEL AND IRON

## TACKLE BLOCKS

—MADE BY—

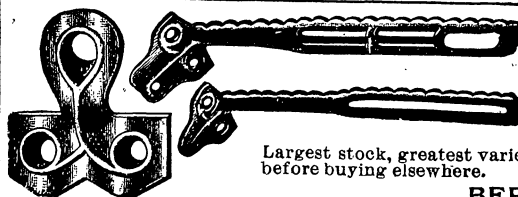
**The Cleveland Block Co.,**

**CLEVELAND, OHIO, U. S. A.,**

**ARE BETTER IN EVERY WAY.**

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

**General Agents:** Topping Brothers, 92 Chambers Street, New York.  
**New England Agents,** - Dodge, Haley & Co., 212 High Street, Boston

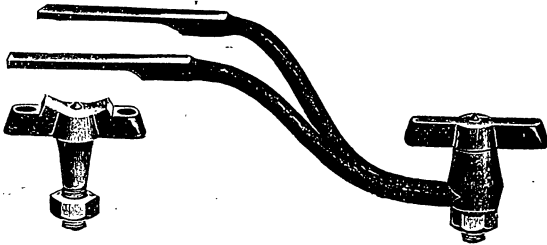


**HEADQUARTERS FOR  
TINNERS' HARDWARE &  
ROOFERS' SUPPLIES.**

Largest stock, greatest variety. Prices lower than ever. Write us before buying elsewhere.

**BERGER BROS., Philadelphia.**

**RICHARD ECCLES,**  
**AUBURN, N. Y.,**  
 —MANUFACTURER OF—  
**CARRIAGE FORGINGS,**  
 Couplings, Clips, King Bolts, Fifth Wheels, &c.  
 SEND FOR SUPPLEMENT TO CATALOGUE



Showing a full line of Axle Clips, Spring Bar Clips, Three Piece Saddle Clips and King Bolt Yokes and Braces.

SEND FOR CATALOGUE AND SUPPLEMENT.

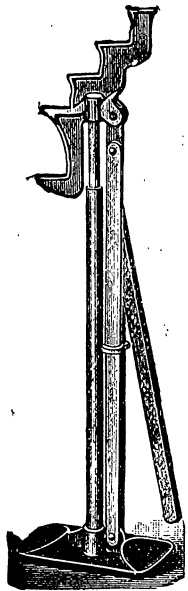
**SASH WEIGHTS!**

**NORTON BROTHERS,**

Manufacturers,

Office: 813 Masonic Temple, CHICAGO.

WORKS AT MAYWOOD, ILL.



**THE TROY WAGON JACK.**

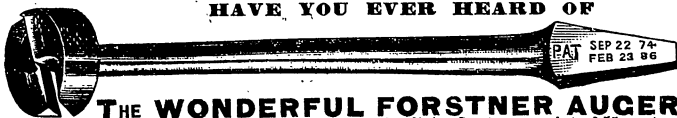
This Jack is superior to all others in the market. It is made in two sizes, No. 555 being intended for use on light wagons, and No. 556 for heavy wagons, although it can be used on any vehicle from the lowest Phaeton to the heaviest truck or brewery wagon. Its lifting capacity is greater than any other Jack manufactured, and being made of iron it is indestructible. No. 555 weighs 7 pounds. No. 556 weighs 10 pounds. It is easily handled and operated, and is the cheapest first-class Wagon Jack offered to the trade.

The flat solid base is a great improvement over Jacks having a ring or rim base, as it cannot settle in the ground when in use, or tip when lifting a heavy load.

Sold by all Leading Jobbers in General and Saddlery Hardware at Manufacturers' Prices.

**COVERT MFG. CO.,**  
**WEST TROY, N. Y.**

HAVE YOU EVER HEARD OF



**THE WONDERFUL FORSTNER AUGER BIT ?**

If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 55 cents. It will bore Round, Oval and Square Holes, and cannot be equalled for fine carpentry, cabinet or pattern work. Discount to dealers on application.  
 FOR SALE BY ALL HARDWARE DEALERS  
**THE BRIDGEPORT GUN IMPLEMENT CO.,**  
 313 and 315 Broadway, New York.



It has no equal for hard service.

The reinforcement piece stiffens the back and braces the ends.

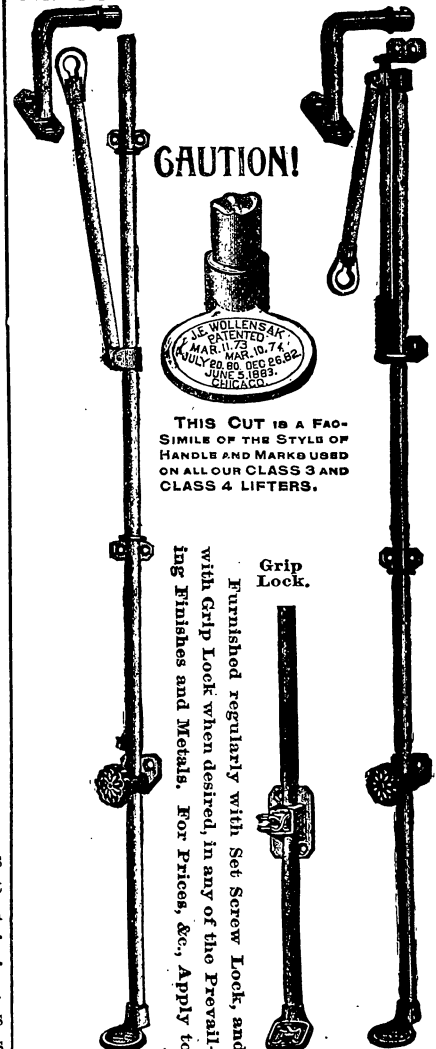
**Transom...Lifters**

**OLD RELIABLE**

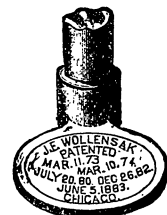
**J. F. WOLLENSAK'S PATENT.**

**CLASS 3.**

**CLASS 4.**



**CAUTION!**



THIS CUT IS A FAC-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

Furnished regularly with Set Screw Lock, and with Grip Lock when desired, in any of the Prevailing Finishes and Metals. For Prices, &c., Apply to

**Grip Lock.**

**J. F. WOLLENSAK, CHICAGO, ILL.**

**HARDWARE DEALERS**

CAN RECOMMEND THE

**CHAMPION METAL WINDOW SASH CHAINS**

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

MANUFACTURED ONLY BY

**"THOMAS MORTON,"**

65 Elizabeth Street,

Write for Prices.

**NEW YORK.**

**Carriage Forgings**

Of every description. Also Special Forgings.

**E. D. CLAPP MFG. CO., Auburn, N. Y.**

New illustrated catalogue issued May 10th mailed on application.

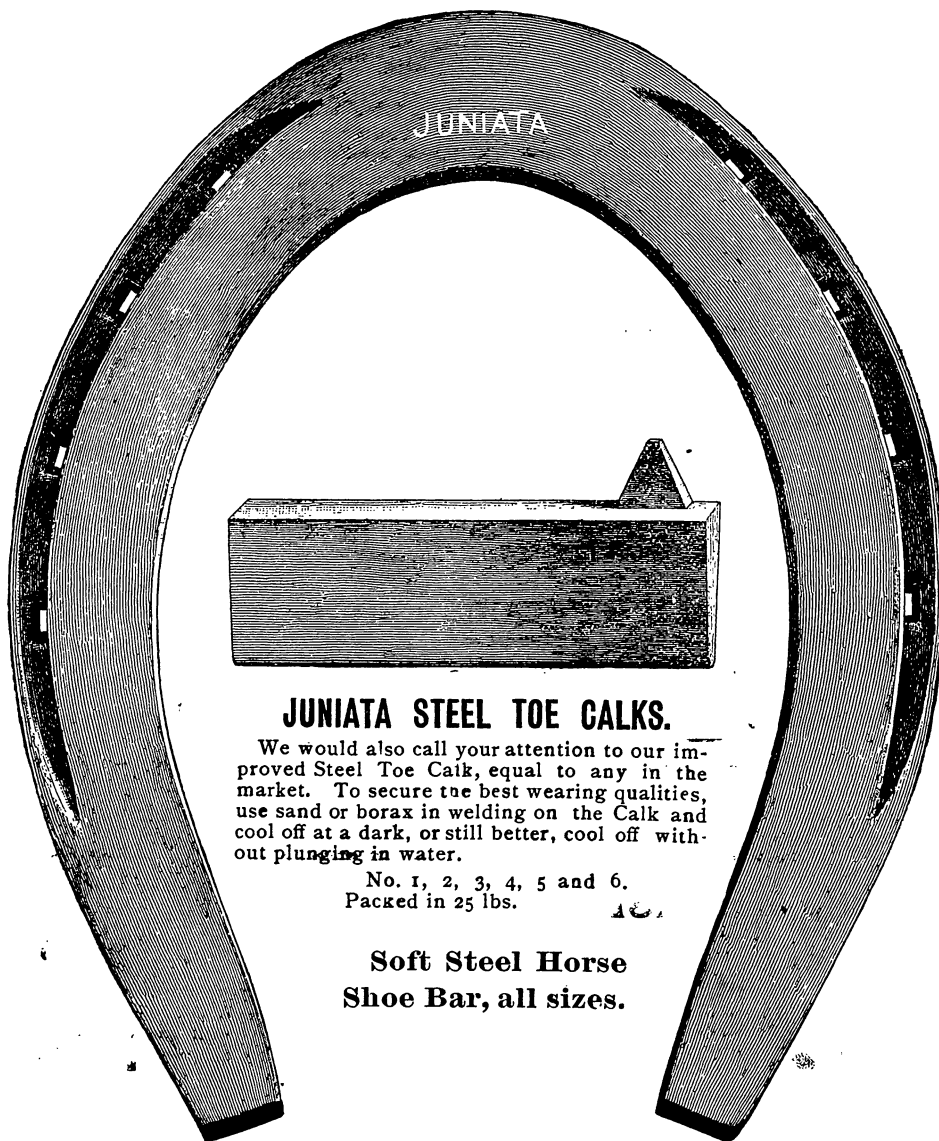
**Practical Hints on Joint Wiping, For Beginners in Plumbing.** This book contains a reprint from *The Metal Worker* of two articles on the method of Joint Wiping, an operation calling for a very large degree of manual skill. It is illustrated from photographs representing the hands and tools when wiping joints in various positions, and gives all the assistance that description of the work can furnish. With thirty-five illustrations, 43 pages, paper, \$0.25

For Sale by David Williams, 96-102 Reade St., N. Y.

# "STEEL HORSE SHOES."

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



## JUNIATA STEEL TOE CALKS.

We would also call your attention to our improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities, use sand or borax in welding on the Calk and cool off at a dark, or still better, cool off without plunging in water.

No. 1, 2, 3, 4, 5 and 6.  
Packed in 25 lbs.

Soft Steel Horse  
Shoe Bar, all sizes.

## No. 2 EXTRA SWAGED FRONT.

The advantages of these shoes are that, being made of vastly superior material, they will never show signs of red-shortness or cold shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows :

No. 1, 15 more shoes to the keg.

No. 3, 10 more shoes to the keg.

" 2, 14 " " " " " 4, 8 " " " "

And other sizes in proportion.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

# SHOENBERGER & CO.,

JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

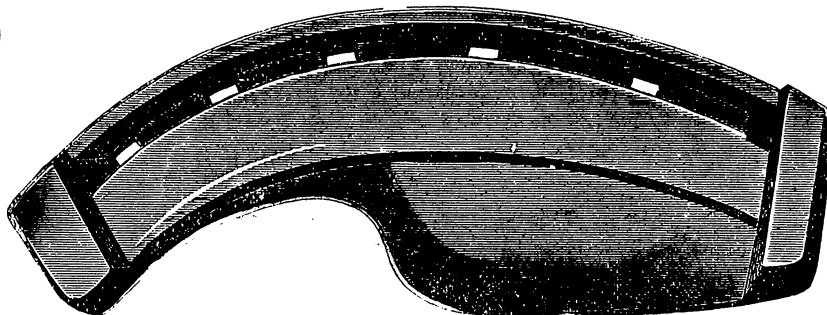


# SCRANTON FORGING CO.,

SCRANTON, PA

## CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

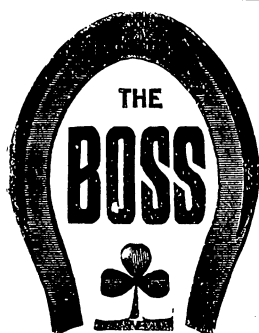
FORGED  
OX  
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



## HORSE AND MULE SHOES

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,

CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,  
MANUFACTURERS OF

### Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Tee Weight Shoes and Goodenough Shoes.  
Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres., C. H. PERKINS, Gen. Manager, R. W. COMSTOCK, Sec'y,  
CHARLES B. STARK, Treas.  
J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.



Elegant Iron.

Beautiful Shape.

HORSE SHOES,  
*Light, Medium and Heavy.*

MULE SHOES,  
*Light, Medium and Heavy.*

Illustrated booklet and prices to all parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

ARTHUR B. CLARKE, President.

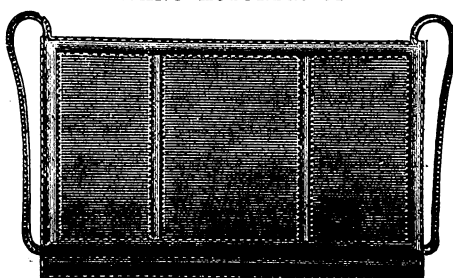
Chicago Office, 45 La Salle St

Richmond, Va., U. S. A.

## McKinnon Dash and Hdw. Co., Ltd.,

MANUFACTURERS OF

Dashes,  
Fenders,  
Roll Up Straps,  
Prop Block  
Washers  
and  
Shaft Leathers.



"X" PATTERN.

Largest Capacity in  
the World.

FACTORIES AT

Buffalo, N. Y.,  
Columbus, O.,  
St. Catharines, Ont.

STORE AT

Cincinnati, O.

BURDEN'S

## HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

## The Burden Iron Co.

TROY, N. Y.

## PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.

ROLLING MILLS AND FACTORIES,

Poughkeepsie, N. Y.

Joliet, Ill.

NEW YORK OFFICE, No. 66 Reade St.

## Standard Horse Shoe Co.,

Manufacturers of

### HORSE AND MULE SHOES.

Made from best quality of Scrap Iron  
and old Horse Shoes.

4 Liberty Square, Boston, Mass.



CENTENNIAL EXPOSITION  
AT PHILADELPHIA.

WORLD'S COLUMBIAN EXPOSITION  
AT CHICAGO.

# HIGHEST AWARD

TO THE

# PUTNAM

HOT-FORGED AND HAMMER-POINTED

# HORSESHOE NAILS.



CALIFORNIA MID WINTER INTERNATIONAL EXPOSITION.

PUTNAM NAIL CO.,  
Boston, Mass.

GENTLEMEN:—The official list of awards of the American Exhibitors has been handed to me to-day by the Director General, and I am pleased to notify you officially that your exhibit, at the California Mid Winter International Exposition, has received the first award for horse shoe nails. The first award is a gold medal.

Yours respectfully,

EDWARD SCOTT,

U. S. Commissioner.

Send For Samples of Hot-Forged and Hammer-Pointed Nails to

PUTNAM NAIL CO., NEPONSET, BOSTON, MASS.

# H. D. SMITH & CO.

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

## CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

# FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

## CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,  
VERGENNES, VERMONT.

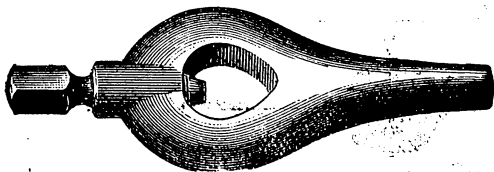
All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents, New York.

## LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.  
It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



No.	Inch.	Price.	No.	Inch.	Price.
1.....	3/4	\$0 60	11.....	2 1/2	\$1 45
2.....	7/8	70	12.....	3	1 60
3.....	1	70	13.....	3 1/2	1 80
4.....	1 1/4	80	14.....	4	2 10
5.....	1 1/2	80	15.....	4 1/2	2 75
6.....	1 3/4	95	16.....	5	3 25
7.....	1 7/8	95	17.....	5 1/2	4 00
8.....	2	1 10	18.....	6	5 00
9.....	2 1/4	1 20	19.....	7	6 00
10.....	2 1/2	1 35	20.....	8	7 00

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.

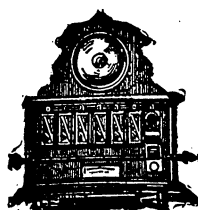
These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

**J. F. Wollensak**  
CHICAGO, ILL.

**ELECTRICAL SUPPLIES**  
SEND FOR ILLUSTRATED PRICE LIST

**KEYS OF ALL KINDS**  
SEND FOR ILLUSTRATED CATALOGUE

**J. F. WOLLENSAK**  
CHICAGO, ILL.



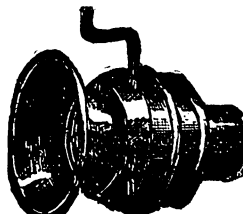
### W. R. OSTRANDER & CO.,

204 FULTON STREET, NEW YORK,

Manufacturers of

SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC  
MECHANICAL AND PNEUMATIC ANNUNCIATORS  
AND BELLS.

Complete outfits of Speaking Tubes, Whistles,  
Electric, Mechanical and Pneumatic Bells. A full line  
always in stock. Send for new catalogue. Factory,  
DeKalb ave. near Knickerbocker, Brooklyn, N. Y.

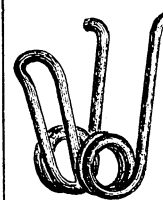


**P. F. BURKE, C. F. DEWICK & CO.**  
Successors to  
Manufacturer of  
PATENT STEEL  
(Blunt and Sharp)  
**TOE-CALKS.**  
—ALSO—  
BURKE'S IMPROVED  
HORSESHOERS'  
FOOT VICE.  
Send for Circulars.  
360 Dorchester Av. Die for Welding  
BOSTON, MASS. Sharp Calks.

## Crescent Horse and Mule Shoes, BAR IRON.

## CRESCENT HORSE SHOE IRON CO.

Max Meadows, Va.



### FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Cut One-half Size.  
Sample pair sent to any hard-  
ware or saddlery firm by ad-  
dressing

The Frost Thill Spring Co.,

Boston, Mass.



### BICYCLE and other DROP FORGINGS

Made to Order.

The Wilcox & Howe Co.,  
Manufacturers of a com-  
plete line of

Carriage Hardware.

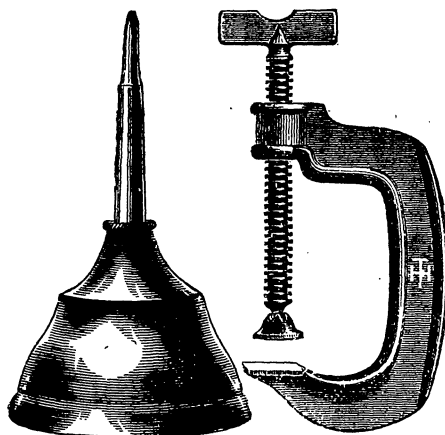
BIRMINGHAM, CONN.

Send for Catalogue.

# BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.

## PATENTED ARTICLES OF MALLEABLE IRON.

**NEW** pattern Heavy Screw Clamps.  
Strongest in the market.



HAMMER'S MALLEABLE IRON OILERS, 3 Sizes.  
HAMMER'S MALL. IRON HAND LAMPS  
HAMMER'S M. I. HANGING LAMPS.  
HAMMER'S ADJUSTABLE CLAMPS.

For sale by all the principal Hardware Dealers.  
Send for Price-List.

**MALLEABLE IRON CASTINGS**  
of superior quality, and Hardware Specialties in  
Malleable Iron made to order.

**HAMMER & CO.,**  
Branford, Conn.

• **IMPROVED MINE LAMP** •  
FOR ANTHRACITE AND  
BITUMINOUS  
MINING

SEAMLESS  
BRASS  
COLLAR  
BRASS LID  
Solid  
No Solder

6  
DIFFERENT  
STYLES  
OF SPOUTS.  
SAMPLE 15¢.

**B.E. LEONARD, Scranton, Pa.**

## Law without Lawyers.

A Compendium of Business  
and Domestic Law for  
Popular Use.

By **H. B. COREY,**

Member of the New York Bar.

PRICE, \$1.00. Post-paid.

A simple, clear and accurate presentation  
of the general laws, and of the laws of the  
several States relating to the rights of prop-  
erty, contracts, debts, partnerships, bank-  
ruptcy, insurance, corporations, marriage,  
divorce, &c., &c., with which are included  
correct copies of all legal instruments and  
forms, such as notes, deeds, mortgages, leases,  
wills, &c., and a dictionary of legal words  
and phrases.

**DAVID WILLIAMS,**

Publisher and Bookseller.

96 - 102 Reade St., New York

This Wrench can be furnished with Short Nut.

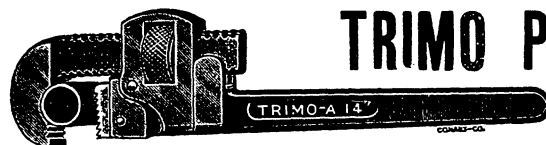


### COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the  
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.  
For Circulars and Price-List, address

**BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.**



## TRIMO PIPE WRENCH.

Forged Steel.

All Parts Interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no  
trouble in close quarters. Does not crush the pipe.

The chain holds securely;  
cannot fall out even if used  
upside down. Readily releases  
when desired. Solid forged  
head. Fine quality of tool steel.  
Interchangeable gripping jaws.

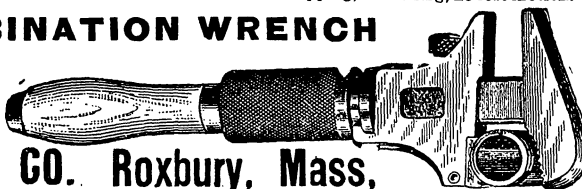


### TRIMO GIANT WRENCH.

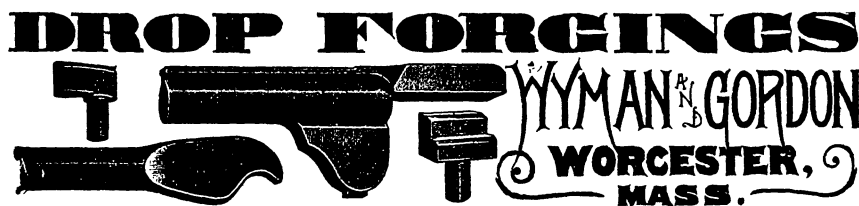
Strongest and safest Pipe Wrench ever  
made. No slipping; no locking; no lost motion.

## TRIMO COMBINATION WRENCH FOR NUTS

AND PIPE.



**TRIMONT MFG. CO. Roxbury, Mass.**



## Screw Plates and Dies.

Drop Forged  
from the



Best Bar  
Steel.

These Screw Plates have a new and novel arrangement for  
holding the dies, making them the most convenient tool of this  
kind made.

**THE BILLINGS & SPENCER CO.**

Hartford, Conn.

Drop Forgings of Every Description.

## "OHIO" LEVER CUTTER

1894 PATTERN. PRICE \$5.00.

Simple, Durable,

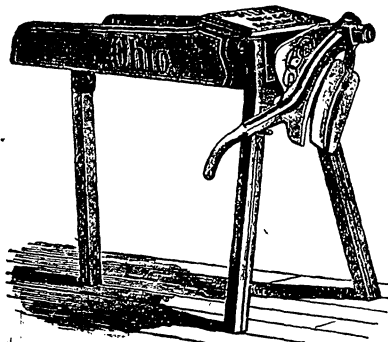
Handsome and Cheap.

It has an eleven-inch Oil-Tempered Sickle Knife  
which can be adjusted to take up all wear, thus  
giving a perfect shear cut at all times.

Shipped K. D. to secure lowest freight rate, and  
can be set up in a moment.

Send for Catalogue and Quotations on our Com-  
plete Line of Ensilage and Fodder Cutters.

**THE SILVER MFG. CO., Salem, Ohio.**

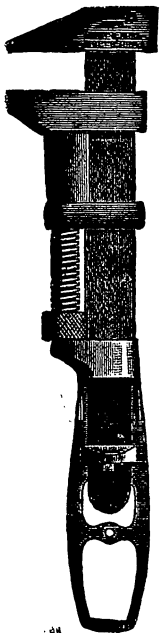
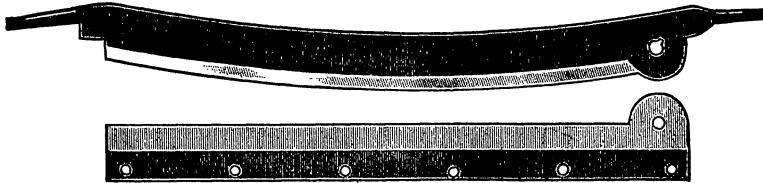
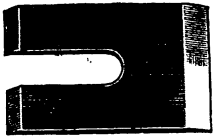
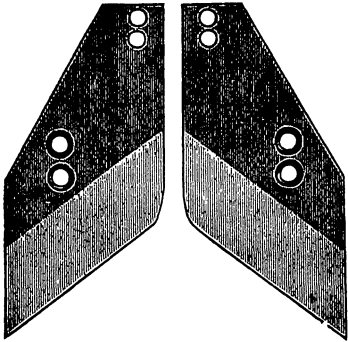


# LORING COES & CO.,

WORCESTER, MASS.

Manufacturers of MACHINE KNIVES.

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

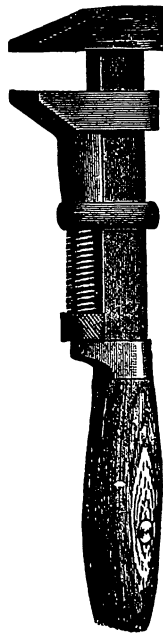


## L. COES'

Genuine Improved  
KNIFE HANDLE  
PATENT

## Screw Wrenches

MANUFACTURED BY  
COES WRENCH CO.,  
WORCESTER, MASS.



Established in  
1839.  
Registered  
March 31, 1874.

Patented July  
6, 1880.  
Patented July  
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

— Straight Bar, Extra Long Nut for Screw in Jaw. —

The BEST MADE and STRONGEST WRENCH in the MARKET.

J. C. McCARTY & CO., } New York Agents.  
JOHN H. GRAHAM & CO., }

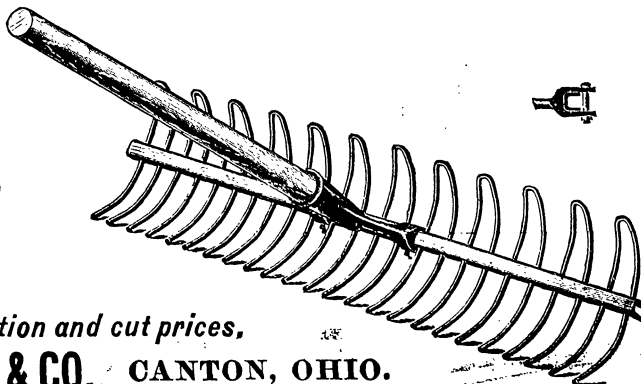
## SASH WEIGHTS.

KINGS COUNTY IRON FOUNDRY,

Office and Works, Nos. 86, 88, 90, 92 North 12th St.,  
BROOKLYN, N. Y.

## "Lawn Queen."

The Best Rake  
for the least  
money.



Write for description and cut prices,  
F. E. KOHLER & CO., CANTON, OHIO.

THE  
"Columbia"  
Trade-Mark.  
SOCKET  
FORKS.

Made in Hay,  
Manure and Spad-  
ing Fork Patterns.

Heavy and long  
Steel Socket. Most  
elegant goods ever  
made.

The Iowa  
Farming Tool Co.,

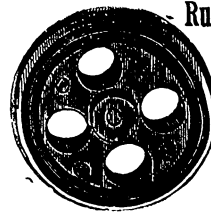
Makers of  
FORKS, HOES,  
RAKES,  
SCYTHES,  
SNATHS, Etc.

For export and  
home trade.  
Catalog free on ap-  
plication.

FT. MADISON,  
IOWA, U. S. A.



Rubber and Iron Wheels



Casters for Trucks,  
Baskets and Boxes  
Heavy Casters for  
Mill use.  
Catalogues free.  
G. P. CLARK, Box 0,  
Windsor, Locks, Conn.

Electric Traction on Railways and Tram-  
ways. By A. BERKENZAUN. The author has en-  
deavored in this book to summarize as concisely as  
possible the present state of electric traction and  
to describe the various methods and constructive  
details which are to-day in use or which have  
marked consecutive steps in the development of  
the art. 213 illustrations, 12mo cloth .....\$4.00  
For sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.



ESTABLISHED IN 1848.

INCORPORATED IN 1877.

# Withington & Cooley Manufacturing Co.,

JACKSON, MICHIGAN, U. S. A.,

MAKERS OF

Forks, Hoes, Garden Rakes, Potato Hooks, Scythe Snaths,  
Grain Cradles, Handles, Wheelbarrows, &c.

## SPECIALTIES.



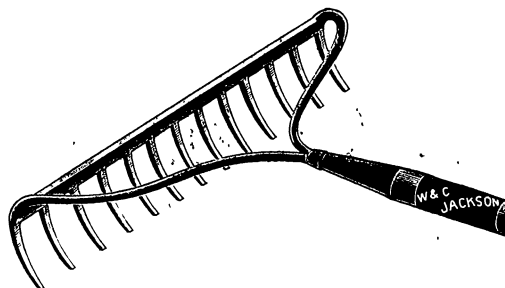
ACME MANURE.



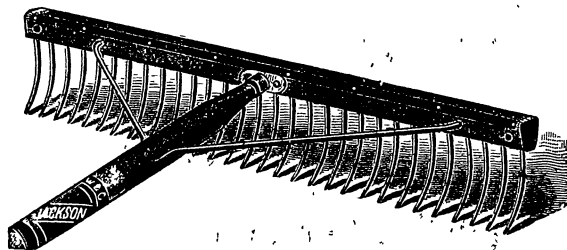
WARREN.



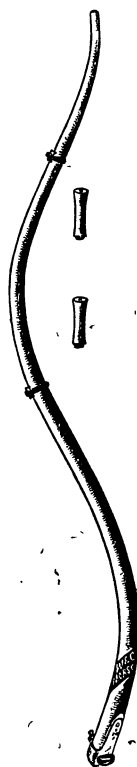
ACME WEEDER.



BOW RAKE.



JACKSON LAWN RAKE.

GRASS  
SNATH.

## The Art of Coppersmithing.

A Practical Treatise on Working Sheet Copper into all Forms.

BY JOHN FULLER, SR.

CLOTH BOUND, 10x7 INCHES, 327 PAGES, 474 ENGRAVINGS.

PRICE, - - \$3.00

### CONTENTS:

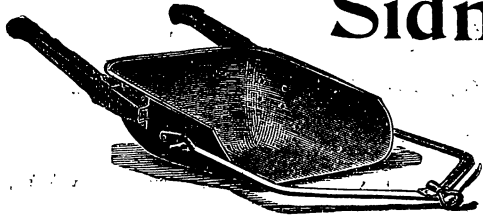
Historical Sketch of Copper; Braziers' Art, or Light Coppersmithing; First Year's Experience; Repairing and Tinning; The Boy's Second Year; Making Washing Coppers; Making Small Brewing Coppers; Table of Dimensions and Capacity; Making Hand Bowls; Making Frying Pans; Making Closet Pans; Making Water Balls; Mounting for Copper Goods; Glue Pots and Tea-Kettles; Oval Tea-Kettles; Beer Mullers; Funnel; Coffee Pots; Saucepans and Pudding Pots; Stewpans; Stock Pots; Fish Kettles; Brazing Pans; Tea Boilers; Warming Pans; Preserving Pans; Dripping Pans; Coal Scoops and Coal Hods; Making Coal Scoops; Planishing and Smoothing; Cranes or Syphons; Pumps; Appliances of Railway and Marine Coppersmiths; Making Copper Pipe; Piecing and Joining Pipes; The Fire Pots; Fire Pot Set for Brazing Joint; Soft Soldering Large Joints; Taking Templates; Filling and Bending; Making Bends; Template Boards; Patching Pipes; Outlets; Expansion Joints; Tee Pieces; Three-way Pieces; Cross or Four-way Pieces; Saddle Fire; Marine Work; View of Maudsley, Sons & Field's Shop; Making Large Bends; Making Double Bends; Brazing on Flanges; Short Bends; Air Pipes for Ships; Making Hollow Spheres; Brazing Sheet Brass; Locomotive Brass Work; Brass Dome Covers; Heavy Pipes for Breweries; Brewing Coppers or Kettles; Dome Coppers; Dome and Pan Coppers; Tallow Coppers; Dyers' Coppers; Sugar Tieches; Stills.

—Sent, Postpaid, on Receipt of Price by—

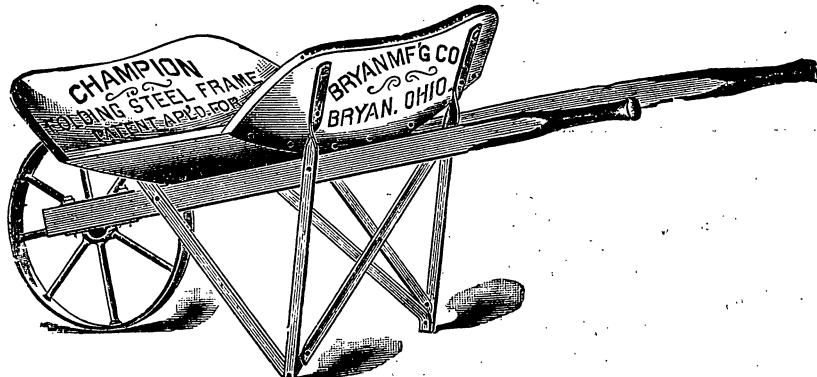
DAVID WILLIAMS, Publisher, 96-102 Reade St., N. Y.

# Sidney, = Ohio,

Is the place to get  
these goods at bot-  
tom figures.

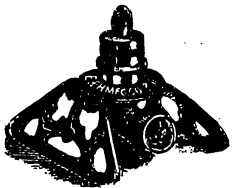


Sidney Steel Scraper Co., 924 Poplar St.



## KNOCKED DOWN!

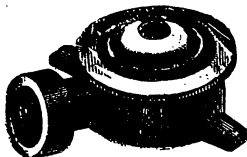
The Champion Wheelbarrow occupies far less space than any other make of barrow but this is not its most important feature, by any means. Its great strength and adjustment so that what would tire the user of any other make makes this the lightest on earth, are two of its good points. It has many others. Write for prices.



Japanese No. 12,  
Adjust.

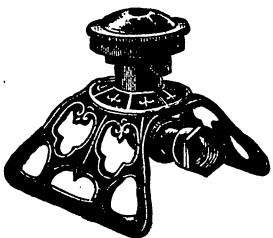
## LAWN SPRINKLERS.

Cactus No. 8.



We manufacture the BEST and  
CHEAPEST Lawn Sprinklers in  
the World.

The only Sprinklers which have no revolving parts to leak or wear out.  
The only Sprinklers free from small holes, and which cannot become clogged with gritty substances.  
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.  
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures.  
We also manufacture the old style revolving sprinklers, but for our own use would not have them.

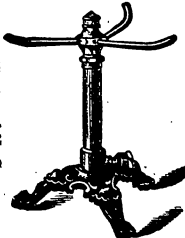


Cactus No. 5.

Ette & Henger Mfg. Co.

ST. LOUIS, MO.

National N. G.



SEND FOR DESCRIPTIVE CIRCULARS.

## DON'T

Lay in your stock of

## Lawn Mowers

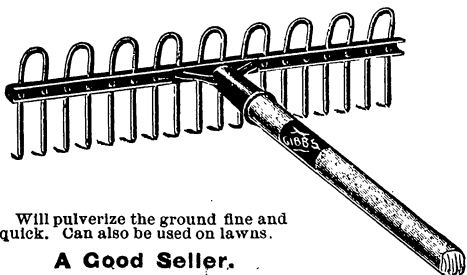
Before you see

## BLAIR MFG. CO.'S

Line for 1895.

List Now Ready. Send for It.

SPRINGFIELD, MASS.



Will pulverize the ground fine and  
quick. Can also be used on lawns.

A Good Seller.

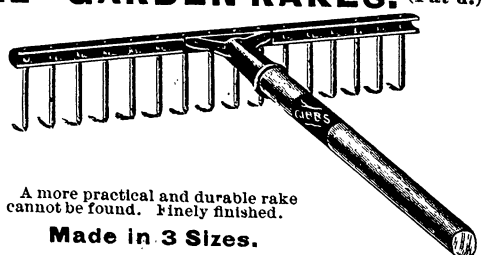
**CIBBS MFG. CO., Canton, Ohio.**

**"BOSS" and "IDEAL" GARDEN RAKES. (Pat'd.)**  
**WILL NOT BREAK.**

ALL STEEL.

Strong, Heavily Tinned.

**LOW IN PRICE.**



A more practical and durable rake  
cannot be found. Finely finished.

Made in 3 Sizes.

JNO. H. GRAHAM & CO., N. Y. Agents.  
113 Chambers St., N. Y.

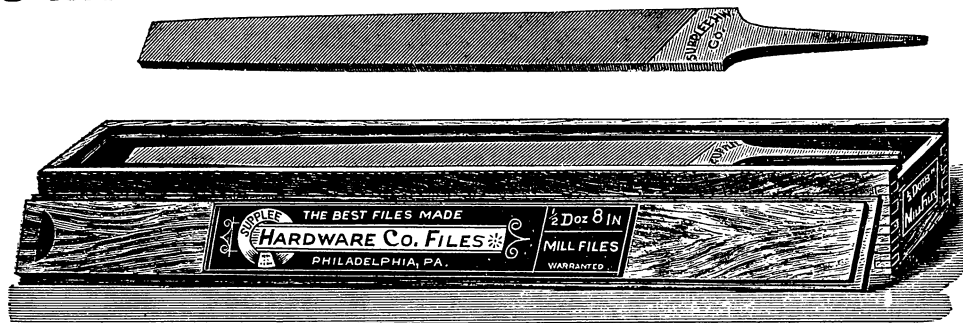
# COME TO THE FRONT

Is just what we did when we brought out our now well known

## Supplee Hardware Co.

Complete Line of Files—all kinds—all sizes.

**DO YOU HANDLE THEM? IF NOT YOU OUGHT TO.**



## McGuire's ♦ Diamond.

MANUFACTURED BY

**Dille & McGuire Mfg. Co.,**  
RICHMOND, IND., U. S. A.

### PRICE-LIST.

Wheels, 8 Inches High. Cutter, 5½ Inches Diameter.

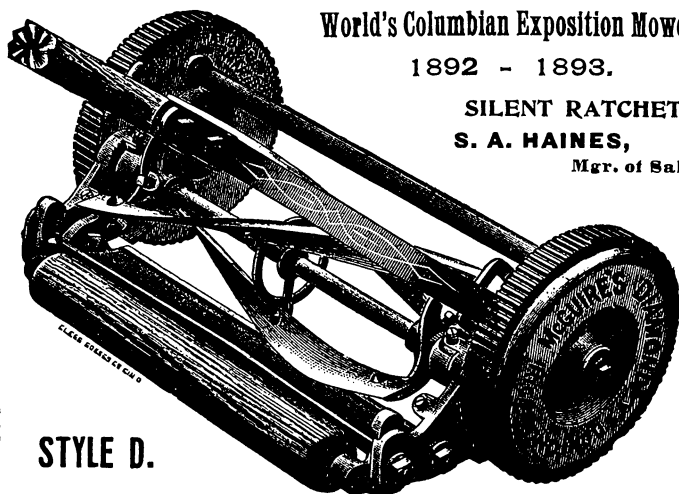
LENGTH.	LIST.	Discount to the
10 Inch	\$13.00	Trade,
12 "	14.00	70 per cent.
14 "	15.00	F. O. B. Factory.
16 "	16.00	
18 "	17.00	

PHOSPHOR BRONZE JOURNAL BEARINGS. BEST QUALITY STEEL.

This is the Mower contracted for by the Chief of Construction at the Columbian Exposition; was used on the lawns at the World's Fair grounds during the preparatory season of 1892, and being approved by the Landscape Architects, was adopted exclusively for 1893.

If you wish a first-class Mower in all respects, one that is fully warranted,

**—BUY MCGUIRE'S DIAMOND.**



— OFFICIAL —  
World's Columbian Exposition Mower,  
1892 - 1893.

SILENT RATCHET.

S. A. HAINES,

Mgr. of Sales.

## Chadborn & Coldwell Mfg. Co.,

NEWBURGH, N. Y.,

—Sole Manufacturers of—

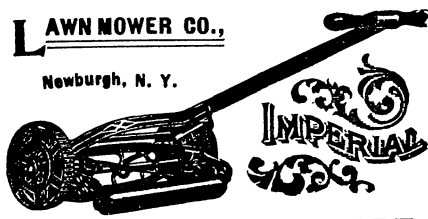


New Model  
AND  
Excelster  
LAWN  
MOWERS  
ALSO  
The Rival,  
The O K,  
Etc., Etc.

Send for Illustrated Catalogue.

## COLDWELL LAWN MOWER CO.,

Newburgh, N. Y.



**THE BEST MOWER MADE.**

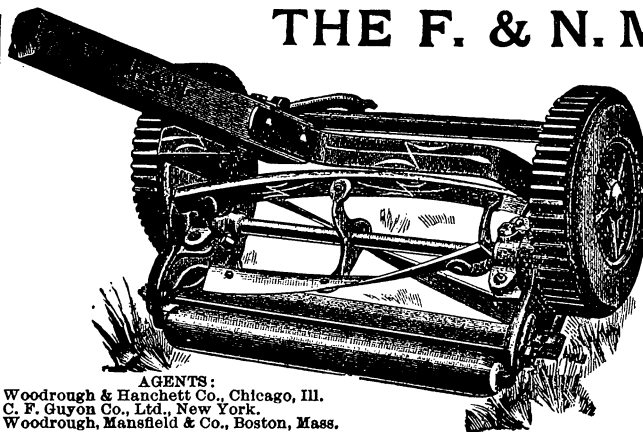
The Lightest Running Mower in the World.

This is the only Lawn Mower that stood the test of working the entire season on the Columbian Exposition Grounds without any repairs.

## THE F. & N. MFG. CO.,

Manufacturers of  
Lawn Mowers  
and  
Grass Catchers  
RICHMOND, IND., U. S. A.

**THE  
F. & N.  
LAWN  
MOWER  
"94."**



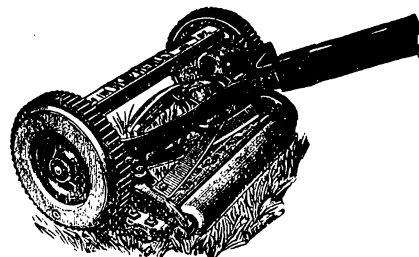
AGENTS:  
Woodrugh & Hanchett Co., Chicago, Ill.  
C. F. Guyon Co., Ltd., New York.  
Woodrugh, Mansfield & Co., Boston, Mass.

Solid Steel Cutter Bar. Reel  
Knives adjusted to Cutter  
Bar. Phosphor Bronze Reel  
Bearings.

## HENLEY'S MOWERS

For Lawns and Parks

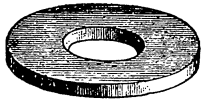
Are first class, high grade machines, made of the best materials, neat, symmetrical, strong and unexcelled in construction and ease of operation. Does perfect work. For prices, address



**M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.**

EASTERN REPRESENTATIVES: H. S. Earle, 110 and 112 N. Warren St., Syracuse, N. Y.; Wm. H. Cole & Sons, 18 S. Charles St., Baltimore, Md.; Carpenter & Bayles, 91 Chambers St., New York City.

# WROUGHT WASHERS



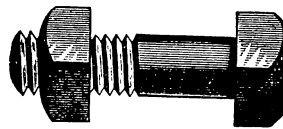
True  
to  
Gauge

Made from *specially rolled* plate by our own *patented machinery*.  
Every washer *flat*, with hole in *true center*. Sold in  
200 lb. kegs, or 1 and 5 lb. paper boxes.

Get prices.

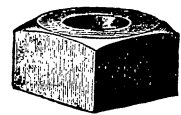
THE MILTON MANUFACTURING CO., MILTON, PA.

## HIGH GRADE



Machine  
Bolts

Stamped to size. Guaranteed extra quality.  
Send for catalogue.



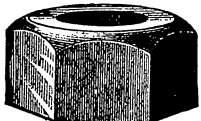
Hot pressed  
Nuts

# Pennsylvania Bolt & Nut Co.

Lebanon Pa.

MANUFACTURERS OF

REFINED BAR IRON · MACHINE BOLTS · TRACK BOLTS · & BOLT ENDS ·  
LAG SCREWS · GIMLET POINTED COACH SCREWS · HOT PRESSED & COLD PUNCHED SQUARE & HEXAGON NUTS ·  
CHAMFERED & TRIMMED NUTS · WROUGHT & CAST WASHERS · TURN BUCKLES ·  
STRUCTURAL & ELECTRICAL FORGINGS · BOILER & BRIDGE RIVETS · CAR FORGINGS & ARCH BARS



PORTCHESTER BOLT & NUT CO.

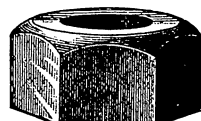
Port Chester N. Y.

MANUFACTURERS OF

BOLTS, NUTS, RIVETS and WASHERS

CHAMFERED AND TRIMMED,

SQUARE AND HEXAGON NUTS A SPECIALTY.

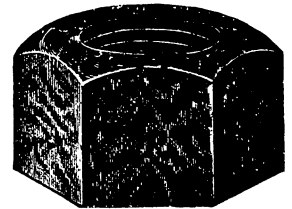


DUNHAM NUT CO.,

UNIONVILLE, CONN.,

Manufacturers of

All Grades  
of  
Finished  
Nuts  
and



Automatic Cold Press Nut Machines.

SEND FOR CATALOGUE.

**BOLTS,** Machine, Car  
Track, Pipe, Loom | **NUTS,**  
Cold Punched  
AMERICAN BOLT COMPANY, - - Lowell, Mass.

EXPANSION BOLTS:



Manufacturers of Single and Double,  
For fastening all kinds of Structure to Brick and Stone  
Work. Catalogue furnished on application.  
STEWART & ROMAINE MFG. CO., - - Philadelphia.

The "MAJOR" Hog Ring and Ringer.



Send for 1894  
Catalogue and Prices.



Hardware Specialties.  
OAKES & IRWIN,  
DECATUR, ILL.

HARVEY HUBBELL,  
Machinery and Tools Mfr.  
**SCREWS**  
Machine Screws for electrical pur-  
poses. Sample box free. Send for cir-  
cular.  
BRIDGEPORT, CONN.

WM. H. HASKELL, PRESIDENT.

E. S. MASON, TREASURER.

D. A. HUNT, AGENT.

**WM. H. HASKELL CO.,**

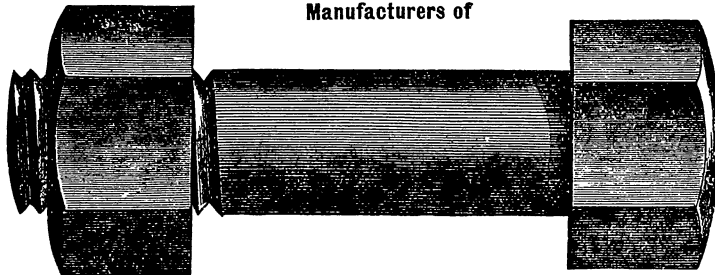
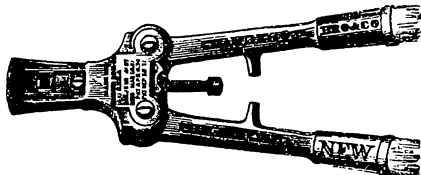
—MANUFACTURERS OF—

**GIMLET POINT  
COACH SCREWS****Bolts, Cold-Punched  
Nuts and Washers,  
SUITABLE FOR MACHINERY  
OF ALL KINDS.**

Office and Works: 451 Main St., PAWTUCKET, R. I., U. S. A.

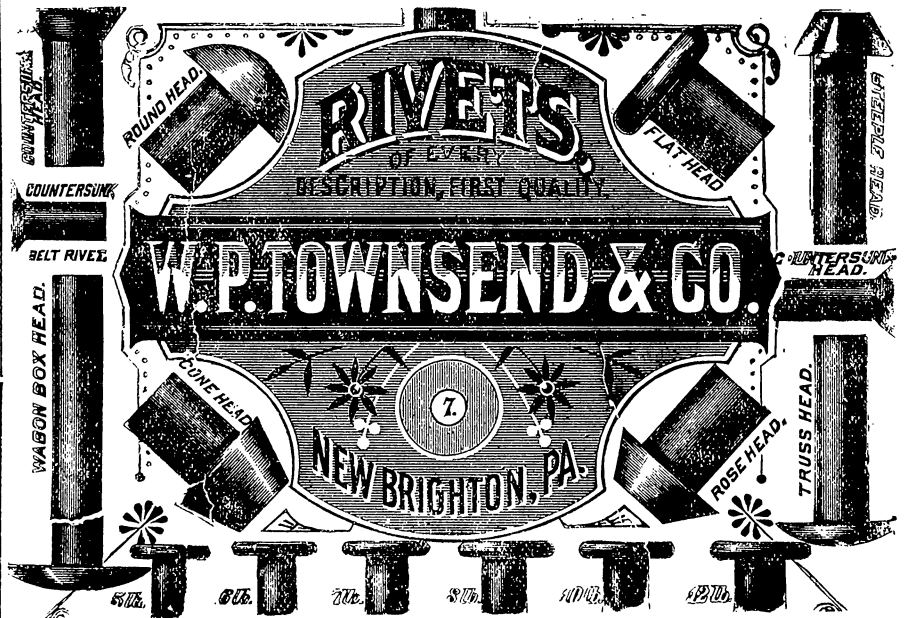
**HENRY B. NEWHALL CO., Agents,****105 CHAMBERS STREET, NEW YORK.****WORCESTER MACHINE SCREW CO., Worcester, Mass.**

Manufacturers of

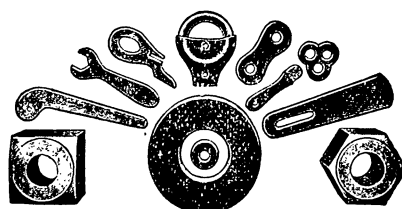
**SET,  
CAP AND  
MACHINE  
SCREWS.****STUDS FOR  
STEAM  
ENGINE,  
PUMPS, &c.****EXPANSION BOLTS.**For Fastening all Kinds of Structure to  
Brick and Stone Work.Patentee and M'r, **ISAAC CHURCH,**  
Send for Catalogue. 1521 Walnut St., TOLEDO, O**BOLT & RIVET CLIPPERS,**For cutting off the ends of Bolts and Rivets.  
Liberal discounts to the trade.**CHAMBERS BROTHERS COMPANY**52d St., BELOW LANCASTER AVE.,  
PHILADELPHIA, PA.**WM. H. JACOBUS**

No. 90 Chambers St., New York

New York Office of

J. F. Wollensak.  
Barnes Mfg. Co.  
N. R. Streeter & Co.  
Geo. W. Nock.  
Tuck Mfg. Co.Henis Vegetable Press.  
Dille & McGuire Mfg. Co.  
Bommer Bros.  
Palmer Hdw. Mfg. Co.  
Wire Goods Co.Nationa. Rivet Works.  
Wolcott Hdw. Co.  
Fibre Head Mallet.  
Burnside Cedar Faucets.  
Cleveland Window Shade Co.Zimmerman's Blind Adjusters.  
Garritt & Beach.  
Wilcox Mfg. Co.  
M. B. Schenck & Co.  
Hemacite Mfg. Co.Franklin Mfg. Co.  
Atlas Mfg. Co.  
National Specialty Mfg. Co., Ltd.

ESTABLISHED 1865.

**J. H. Sternbergh & Son,** **READING, PENNA.****Bolts, Nuts, Washers, Rivets.**Send for our New Catalogue and  
Discounts.**J. FRED WILSON, Worcester, Mass.****Metal Punching AND Die Work.**Cold Punched Nuts and Washers  
for all Purposes.

SEND FOR PRICES ON

**SPECIALTIES IN LINE OF PRESS WORK.**



# CLASSIFIED LIST OF ADVERTISERS.

**Advertising.**  
Maule, Francis I., Philadelphia, Pa.

**Agricultural Implements.**  
Iowa Farming Tool Co., Ft. Madison, Iowa.  
Sickles, Sweet & Lyon, 35 Barclay St., N. Y.  
Withington & Cooley Mfg. Co., Jackson, Mich.

**Air Compressors.**  
Norwalk Iron Works, S. Norwalk.

**Air Moving Machinery.**  
Howard & Morse, 45 Fulton, N. Y.

**Aluminum.**  
Illinois Pure Aluminum Co., Lemont, Ill.  
Pittsburgh Reduction Co., Pittsburgh.  
Scovill Mfg. Co., Waterbury, Conn.

**Aluminum, Brass and Bronze.**  
Gaylord, F. L. Co., Ansonia, Conn.  
Haight & Clark, Albany, N. Y.  
Pratt & Cady Co., Hartford, Conn.

**Analytical Chemists.**  
Britton, J. Blodgett, Philadelphia, Pa.  
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

**Anti-Friction Metals.**—See *Babbitt Metal*.

**Anvils.**  
Eagle Anvil Works, Trenton, N. J.

**Anvil and Vise (Combination).**  
Fulton Iron & Engine Works, Detroit, Mich.

**Apple Parers.**  
Goodell Co., Antrim, N. H.

**Arms and Ammunition.**  
Chicago Fire Arms Co., Chicago, Ill.  
Hartley & Graham, 313 & 315 Broadway, New York.  
Ideal Mfg. Co., New Haven, Conn.  
Lovell, Jno. P. Arms Co., Boston, Mass.  
Stevens, J. Arms and Tool Co., Chicopee Falls, Mass.  
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

**Attorney at Law.**  
Coleman, I. A., Chicago, Ill.

**Auctioneers.**  
Bissell, E. Son & Co., N. Y.

**Auger Bits.**  
Bridgeport Gun Implement Co., 313-315 Broadway, New York.

**Axes.**  
Peck, A. G. & Co., Cohoes, N. Y.

**Axe Wedges.**  
Sawyer Hdw. & Supply Co., Pawtucket, R. I.  
Thomas, W. H., Jenkintown, Pa.

**Axes, Springs, &c., Manufacturers of.**  
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.  
Wurster, F. W. & Co., Brooklyn, N. Y.

**Babbitt Metal.**  
Bridgeport Deoxidized Bronze and Metal Co., Bridgeport, Conn.  
Crown Smelting Co., Chester, Pa.  
Hertz, T. & Son, St. Louis, Mo.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
Reeves, Paul S., Philadelphia, Pa.  
Syracuse Smelting Works, Syracuse, N. Y.

**Bakers and Roasters.**  
Bronson Supply Co., Cleveland, Ohio.

**Bale Ties.**  
Kilmer Mfg. Co., Newburg, N. Y.

**Barb Wire and Fence.**  
Cincinnati Barb Wire Fence Co., Cincinnati, O.  
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.  
Indiana Wire Fence Co., Crawfordsville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
Washburn & Moen Mfg. Co., Worcester.

**Bar Iron, Manufacturers of.**  
Etna-Standard Iron & Steel Co., Bridgeport, Ohio.  
Allentown Rolling Mill, Allentown, Pa.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Montour Iron & Steel Co., Danville, Pa.  
Mahoning Valley Iron Co., Youngstown, Ohio.  
Sternbergh, J. H. & Son, Reading, Pa.

**Barrel Openers.**  
Am. Specialty Co., Hartford, Conn.

**Bellows, Manufacturers of.**  
Scott, Geo. M., Chicago, Ill.

**Bells.**  
Bevin Bros. Mfg. Co., East Hampton, N. J.

**Belting Dressing.**  
Jos. Dixon Crucible Co., Jersey City, N. J.

**Belting Fasteners.**  
Bristol Co., Waterbury, Conn.  
Claffen Mfg. Co., Cleveland, Ohio.  
Sawyer Hdw. & Supply Co., Pawtucket, R. I.  
Talcott, W. O., Providence, R. I.

**Belting, Makers of.**  
Alexander Bros., 412 N. 3d, Phila.  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Engineering Co., Phila., Pa.  
Main Belting Co., Philadelphia, Pa.  
N. Y. Belting & Packing Co., Ltd., N. Y.  
Roberts Mfg. Co., Pittsburgh, Pa.  
Shultz Belting Co., St. Louis, Mo.

## Bicycles.

Crawford Mfg. Co., Hagerstown, Md.  
Eagle Bicycle Mfg. Co., Torrington, Ct.  
Grand Rapids Cycle Co., Grand Rapids, Mich.  
League Cycle Co., Hartford, Conn.  
Lovell, Jno. P. Arms Co., Boston, Mass.  
Pope Mfg. Co., Boston, Mass.

**Bicycle Spokes.**  
Excelsior Needle Co., Torrington, Ct.

**Bicycle Sundries.**  
Bevin Bros. Mfg. Co., E. Hampton, Mass.

**Bit Braces.**  
Amidon Tool Corp., Buffalo, N. Y.

**Blocks, Tackle, Makers of.**  
Cleveland Block Co., Cleveland, O.  
Fulton Iron & Engine Works, Detroit, Mich.

**Blowers.**  
Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Sturtevant, B. F. & Co., Boston, Mass.

**Boats, Sporting.**  
American Rubber Boat Co., N. Y.

**Boiler Plates.**  
Carbon Steel Co., Pittsburgh, Pa.  
McIlvain, Wm. & Sons, Reading, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Pottstown Iron Co., Pottstown, Pa.

**Boilers, Copper.**  
Randolph & Clowes, Waterbury, Conn.

**Boilers, Steam.**  
Babcock & Wilcox Co., 30 Cortlandt.  
Harrison Safety Boiler Wks., Phila., Pa.  
Pollock, W. E. & Co., Youngstown, O.  
Porter, H. K., Boston, Mass.  
Southward Fdy. & Mch. Co., Phila., Pa.  
Sterling Co., Chicago, Ill.  
Wetherill, Robt. & Co., Chester, Pa.

**Bolt Cutters.**  
Chambers Bros. Co., Philadelphia.  
Howard Iron Works, Buffalo, N. Y.  
Wells Bros. & Co., Greenfield, Mass.

**Books.**  
Republic Press, 14 Lafayette Place, N. Y.  
Williams, David, 98-102 Reade, N. Y.

**Boring Machines.**  
Buckeye Mfg. Co., Union City, Ind.

**Box Banders.**  
Goodell, J. W., Burlington, Vt.

**Boxes, Hdw. Shelf, &c.**  
Green, A. H., 22 Park Place, N. Y.  
Jones, Jesse & Co., Philadelphia, Pa.

**Brass, Manufacturers of.**  
Ansonia Brass & Copper Co., N. Y.  
Daval, John & Sons, 100 John, N. Y.  
Dume & Atwood Mfg. Co., N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass & Copper Co., Rome, N. Y.  
Scovill Mfg. Co., Waterbury, Conn.  
Waterbury Brass Co., 296 B'way, N. Y.

**Brass Butt Hinges.**  
Tiebout, W. & J., 16 & 18 Chambers, N. Y.

**Brass Founders.**  
Cramp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.  
Eynons-Evans Mfg. Co., Philadelphia, Pa.

**Brass Goods.**  
Brass Goods Mfg. Co., 88 Chambers, N. Y.

**Bread and Cake Knives.**  
Clausen Shear Co., Fremont, O.

**Bridge Builders.**  
Berlin Iron Bridge Co., East Berlin, Ct.

**Bronze (Tobin).**  
Ansonia Bronze & Copper Co., 10-21 Cliff Street, N. Y.  
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.

**Brooms and Brushes.**  
Rice Mfg. Co., New Durham, N. H.

**Builders' Hardware.**  
Deltz, A. E., 97 Chambers St., N. Y.  
Reading Hdw. Co., Reading, Pa.  
South, W. A. Co., Salem, Mass.  
Yale & Towne Mfg. Co., Stamford, Ct.

**Burr Wheels.**  
Torrance Iron Co., Troy, N. Y.

**Butchers' Steels.**  
Chatillon, John & Sons, 85-89 Cliff St., N. Y.

**Butcher and Shoe Knives, Manufacturers of.**  
Chatillon, John & Sons, 85-89 Cliff St., N. Y.  
Goodell Co., Antrim, N. H.  
Wilson, John, Sheffield, England.

**Butts and Hinges.**  
McKinney Mfg. Co., Allegheny, Pa.  
Sabin Machine Co., Montpelier, Vt.

Stanley Works, New Britain, Conn.  
Tiebout, W. & J., 16 Chambers, N. Y.  
Wrightsville Hdw. Co., Wrightsville, Pa.

**Cabinet Benches.**  
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

**Calipers and Dividers.**  
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.  
Starrett, L. S., Athol, Mass.

**Car Axles.**  
Roberts, A. & P. & Co., Phila.

**Carboy Stands.**  
Wolf, W. & L., Philadelphia, Pa.

**Carriage Hardware, Makers of.**  
Clapp, E. D. Mfg. Co., Auburn, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.  
Eccles, Richard, Auburn, N. Y.  
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.

**Cartrons Forging Co., Scranton, Pa.**  
Witch & Howe, Birmingham, Conn.

**Cartridge Reloading Tools.**  
Ideal Mfg. Co., New Haven, Conn.

**Carvers' Tools.**  
White, Van Gahn & Co., 15-17 Chatham Square, N. Y.

**Casters, Wheel, &c.**  
Clark G. P., Windsor Locks, Conn.

**Castings, Iron and Steel.**  
Allentown Hdw. Wks., Allentown, Pa.  
Booth, The Lloyd Co., Youngstown, O.  
Boston Casting Co., So. Boston, Mass.  
The Burr & Houston Co., Brooklyn, N. Y.

**Cheney, S. & Son, Manlius, N. Y.**  
Chester Steel Casting Co., Phila.

**Chrome Steel Works, Brooklyn, N. Y.**  
Eureka Cast Steel Co., Chester, Pa.

**Flagg, Stanley G. & Co., Phila.**  
Harrison Foundry Co., Cleveland, O.

**Haight & Clark, Albany, N. Y.**  
Palmer & De Mooy Fdry. Co., Cleveland, O.

**Parsons, R. E. Co., Bridgeport, Conn.**  
Pratt & Cady Co., Hartford, Conn.

**Sessions Foundry Co., Bristol, Conn.**  
Shickel, Harrison & Howard Iron Co., St. Louis, Mo.

**Spencer's I. S. Sons, Guilford, Conn.**  
Standard Fdy. & Mfg. Co., Cleveland, O.

**Torrance Iron Co., Troy, N. Y.**  
Union Lock & Hdw. Co., Lancaster, Pa.

**Walker Mfg. Co., Cleveland, Ohio.**  
Wetherill, Robert & Co., Chester, Pa.

**Wilcox, Crittenden & Co., Middletown, Conn.**

**Castings, Malleable.**  
Arcade Malleable Iron Co., Worcester, Mass.

**Hammer & Co., Branford, Conn.**  
Torrance Iron Co., Troy, N. Y.

**Catalogue Files.**  
Folding Paper Box Co., So. Bend, Ind.

**Chains.**  
Bradlee & Co., Philadelphia.  
Garland Chain Co., Rankin, Pa.  
Link Belt Engineering Co., Phila., Pa.  
McKay, Jas. & Co., Pittsburgh, Pa.

**Chimneys.**  
Phila. Engineering Works, Phila., Pa.

**Chisels, Manufacturers of.**  
Buck Bros., Millbury, Mass.  
Buck Chas., Millbury, Mass.

**White, L. & I. J. Co., Buffalo, N. Y.**

**Chucks.**  
Gusman Chuck Co., Hartford, Conn.  
Hogson & Pettis Mfg. Co., New Haven, Conn.

**Skinner Chuck Co., New Britain, Conn.**  
Smith & Edge Mfg. Co., Bridgeport.

**Union Mfg. Co., 103 Chambers, N. Y.**  
Whitton, D. E. Mach. Co., New London, Conn.

**Clamps.**  
Hammer & Co., Branford, Conn.  
Le Count, C. W., So. Norwalk, Conn.

**Clipping Machines.**  
Gillette Clipping Machine Co., 201 E. 23d Street, N. Y.

**Coal.**  
Barns, C. K. & Co., Philadelphia, Pa.

**Wister, Francis, Philadelphia, Pa.**

**Coffee Mills.**  
Enterprise Mfg. Co., Phila., Pa.

**Coke.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Houston, C. B. & Co., Philadelphia, Pa.  
Rainey, W. J., Cleveland, O.

**Wister, Francis, Philadelphia, Pa.**

**Collections.**  
Hardware Board of Trade (Limited), 4 and 6 Warren, N. Y.

**Condensers.**  
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

**Conveying Machinery.**  
Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.

**Jeffrey Mfg. Co., Columbus, O.**  
Link-Belt Engineering Co., Phila., Pa.

**Copper.**  
Jones Sword Co., Chicopee, Mass.  
Ansonia Brass & Copper Co., 10 and 21 Cliff, N. Y.

**Hendricks Bros., 49 Cliff, N. Y.**  
New Haven Copper Co., 294 Pearl, N. Y.

**Randolph & Clowes, Waterbury, Conn.**  
Rome Brass & Copper Co., Rome, N. Y.

**Wister, Francis, Philadelphia, Pa.**

**Copper, Sheet.**  
Camp Metal Mfg. Co., Olney, Phila., Pa.

**Cordage.**  
Samson Cordage Works, Boston, Mass.

**Cork Screws.**  
Williamson, C. T. Wire Novelty Co., Newark, N. J.

**Corrugated Furnaces.**  
Continental Iron Wks., Brooklyn, N. Y.

**Corrugated Iron.**  
Cincinnati Corrugating Co., Piqua, O.  
Jersey City Galvanizing Co., 112 John St., N. Y.

**Moseley Iron Bridge & Roof Co., 6 Day, N. Y.**

**N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.**

**Counting Machines.**  
Durant, W. N., Milwaukee, Wis.

**Cranes.**  
Maris & Beekley, Philadelphia, Pa.  
Ridgway, Craig & Sons, Coatesville, Pa.

**Sellers, Wm. & Co., Inc., Phila., Pa.**  
Whiting Foundry Equipment Co., Chicago, Ill.

**Yale & Towne Mfg. Co., Stamford, Conn.**

**Cupolas, Hot Blast.**  
Byram & Co., Detroit, Mich.

**Whiting Foundry Equipment Co., Chicago, Ill.**

**Cutlery, Importers of.**  
Sickles, Sweet & Lyon, 35 Barclay, N. Y.

**Cutlery, Manufacturers of.**  
Bingham, W. Co., Cleveland, Ohio.

**Dame, Stoddard & Kendall, Boston, Mass.**

**Goodell Co., Antrim, N. H.**  
Northampton Cutlery Co., Northampton, Mass.

**Supplee Hdw. Co., Phila., Pa.**  
Wilson, John, Sheffield, England.

**Cutlery Display Cases.**  
Union Show Case Co., Chicago, Ill.

**Dampers.**  
Arcade Mfg. Co., Freeport, Ill.

**Dashes and Fenders.**  
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.

**Dies.**  
Wilson, J. Fred, Worcester, Mass.

**Die Forgings and Castings.**  
Bliss, E. W. Co., Brooklyn, N. Y.

**Dish Washers.**  
Bolgiano Mfg. Co., Baltimore, Md.

**Door Checks and Springs.**  
Bardsley, J., 149 & 151 Baxter St., N. Y.

**Blount Mfg. Co., Boston, Mass.**

**Door Latches.**  
Thomas, W. H., Jenkintown, Pa.

**Drilling Machines.**  
Beaman & Smith, Providence, R. I.

**Bickford Drill & Tool Co., Cin., Ohio.**  
Buffalo Forge Co., Buffalo, N. Y.

**Champion Blower & Forge Co., Lancaster, Pa.**

**Dallett, Thos. H. & Co., Philadelphia.**  
D'Amour & Littledale 204 E. 43d St., N. Y.

**Dietz, Schumacher & Co., Cincinnati, Ohio.**

**Dwight Slate Machine Co., Hartford, Conn.**

**Goddard, Asa, Worcester, Mass.**

**Halsey, Jas. T., Philadelphia, Pa.**  
Hamilton Mich. Tool Co., Hamilton, O.

**Quint, A. D., Hartford, Conn.**

**Sellers, Wm. & Co., Inc., Phila., Pa.**  
Sigourney Tool Co., Hartford, Conn.

**Silver Mfg. Co., Salem, O.**  
Wiley & Russell Mfg. Co., Greenfield, Mass.

**Drop Forgings.**  
Billings & Spencer Co., Hartford, Conn.

**Boone, W. C. Mfg. Co., Bonton, N. J.**  
Clapp, E. D. Mfg. Co., Auburn, N. Y.

**Eccles, Richard, Auburn, N. Y.**  
Merrill Bros., Brooklyn, E. D.

**R. I. Tool Co., Providence, R. I.**  
Scranton Forging Co., Scranton, Pa.

**Witcox & Howe Co., Birmingham, Conn.**

**Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.**

**Wyman & Gordon, Worcester, Mass.**

**Drop Presses.**  
Bliss, E. W. Co., Brooklyn, N. Y.

**Crosby, G. A. & Co., Chicago, Ill.**  
Miner & Peck Mfg. Co., New Haven, Conn.

**Stiles & Parker Press Co., Brooklyn, N. Y.**

**Vulcan Iron Works, Chicago, Ill.**  
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

**Dumb Waiters.**  
Hutchinson, F. S. Co., 32 Warren Street, N. Y.

**Storm Mfg. Co., Newark, N. J.**

**Dynamite.**  
New York Powder Co., 62 Liberty St., N. Y.

**Dynamos.**  
C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.

**Cutter, Wood & Stevens, Boston, Mass.**  
Eddy Electric Mfg. Co., Windsor, Conn.

**Edge Tools, Makers of.**  
Buck Bros., Millbury, Mass.

**Buck, Chas., Millbury, Mass.**  
Plumb, Fayette R., Philadelphia, Pa.

**White, L. & I. J. Co., Buffalo, N. Y.**

See Alphabetical Index, Pages 101 & 102.

**Egg Beaters.**  
North Bros. Mfg. Co., Philadelphia, Pa.

**Electric Bells and Supplies.**  
Ostrander, W. R. & Co., 204 Fulton St., New York.  
Wollensak, J. F., Chicago, Ill.

**Electric Lights.**  
Electric Construction & Supply Co., 18 Cortlandt St., N. Y.

**Elevator Buckets.**  
Clark, W. J. & Co., Salem, O.

**Elevators, Makers of.**  
Link-Belt Engineering Co., Phila., Pa.  
Morse, Williams & Co., Phila., Pa.  
Penna. Elevator Engineering Co., Phila., Pa.

**Emery and Emery Wheels.**  
Cutter, Wood & Stevens, Boston, Mass.  
Diamond Mach. Co., Providence, R. I.  
N. Y. Belling & Packing Co., Ltd., N. Y.  
Northampton Emery Wheel Co., Leeds, Mass.  
Norton Emery Wheel Co., Worcester, Mass.  
Sterling Emery Wheel Co., 174 Fulton St., N. Y.  
Tanite Co., Stroudsburg, Pa.

**Emery Wheel Dressers.**  
Bay State Stamping Co., Worcester, Mass.

**Engineers and Contractors.**  
Aiken, Henry, Pittsburgh, Pa.  
Herrick, J. A., 284 Pearl St., N. Y.  
Kennedy, Julian, Pittsburgh, Pa.  
Laughlin, Alex. & Co., Pittsburgh, Pa.  
Lean, D. R. Co., Pittsburgh, Pa.  
McClure, Amos, & Co., Pittsburgh, Pa.  
Smythe, S. R. Co., Incorporated, Pittsburgh, Pa.  
Swindell, W. & Bros., Pittsburgh, Pa.

**Engines, Gas and Gasoline.**  
Buckeye Mfg. Co., Union City, Ind.  
Otto Gas Engine Works, Phila., Pa.  
Springfield Gas Engine Co., Springfield, Ohio.

**Engines, Steam, Makers of.**  
Allis, E. P. Co., Milwaukee, Wis.  
Bass Foundry & Machine Works, Ft. Wayne, Ind.  
Harris, Wm. A., Steam Engine Co., Providence, R. I.  
Norwalk Iron Works Co., So. Norwalk Conn.  
Phila. Engineering Works, Phila., Pa.  
Southark Foundry & Machine Co., Phila., Pa.  
Tod, William & Co., Youngstown, O.  
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.  
Westwick, Jno. & Son, Galena, Ill.  
Wetherill, Robt. & Co., Chester, Pa.

**Excelsior.**  
Independent Electric Co., Chicago, Ill.

**Expansion Bolts.**  
Boone, W. C. Mfg. Co., Boonton, N. J.  
Church, Isaac, Toledo, O.  
Steward & Romaine Mfg. Co., Phila., Pa.

**Exporters.**  
Flint & Co., 68 Broad St., N. Y.

**Faucets, Self-Measuring.**  
Lane Bros., Poughkeepsie, N. Y.

**Faucets, Wooden, Makers of.**  
John Sommer's Son, Newark, N. J.

**Feed-Water Heaters and Purifiers.**  
Davis, I. B. & Son, Hartford, Conn.  
Harrison Safety Boiler Works, Phila., Pa.  
National Pipe Bending Co., New Haven, Conn.  
Taunton Locomotive Mfg. Co., Taunton, Mass.  
Webster, Warren & Co., Camden, N. J.  
Whitlock Coll Pipe Co., Elmwood, Conn.

**Fence Ratchets.**  
Wire Fence Supply Co., Indianapolis, Ind.

**Fencing, Iron and Wire.**  
Barnum, E. T., Detroit, Mich.  
Champion Iron Co., Kenton, O.  
Chess Bros., Pittsburgh, Pa.  
Clinton Wire Cloth Co., Clinton, Mass.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., Milmer Mfg. Co., Newburgh, N. Y.  
The Van Dorn Iron Works Co., Cleveland, O.

**Files, Importers of.**  
Moss, F. W., 80 John St., N. Y.

**Files and Rasps, Manufacturers of.**  
Arcade File Works, Anderson, Ind.  
Banker & White, Troy, N. Y.  
Barnett, G. & H., 41 & 43 Richmond, Phila.  
McCaffrey File Co., Philadelphia.  
Nicholson File Co., Providence, R. I.  
Supple Hardware Co., Phila., Pa.

**Fire Brick, Makers of.**  
Borgner, Cyrus, Philadelphia, Pa.  
Gardner, Jas. & Son, Cumberland, Md.  
Kreischer, B. & Sons, foot E. Houston St., N. Y.  
Maurer, H. & Son, 420 E. 23d, N. Y.  
Ostrander Fire Brick Co., Troy, N. Y.  
Valentine, M. D. & Bro. Co., Woodbridge.

**Fire Doors.**  
Berlin Iron Bridge Co., E. Berlin, Conn.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.

**Fishing Tackle.**  
Dame, Stoddard & Kendall, Boston, Mass.

**Flint and Emery Paper.**  
Baeder, Adamson & Co., Phila., Pa.

**Fodder Cutters.**  
Silver Mfg. Co., Salem, O.

**Forges, Portable, &c.**  
Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Foss Mfg. Co., Springfield, Ohio.  
Sturtevant, B. F. Co., Boston, Mass.

**Forgings, Iron and Steel.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Steel-Cambria Iron Co., Johnstown, Pa.  
Frankford Steel Co., Phila., Pa.  
Scranton Forging Co., Scranton, Pa.  
U. S. Projectile Co., Brooklyn, N. Y.

**Forks, Hay and Manure.**  
Iowa Farming Tool Co., Ft. Madison Iowa  
Withington & Cooley Mfg. Co., Jackson, Mich.

**Foundry Facings.**  
Dixon, Jos., Crucible Co., Jersey City, N. J.  
S. Obermayer Co., Cincinnati, O.  
Smith's Pattern Works, Akron, Ohio.

**Foundry Kiddles.**  
Estey, W. S., 65 Fulton, N. Y.

**Foundry Supplies.**  
S. Obermayer Co., Cincinnati, O.  
Rice Mfg. Co., New Durham, N. H.  
Smith, J. D., Fdy. Supply Co., Cinn., O.

**Friction Clutches.**  
Brown, A. & F., 17 Dey St., N. Y.  
Keystone Clutch & Mch. Wks., Phila., Pa.  
Moore & White Co., Philadelphia, Pa.

**Furnaces, Foundry.**  
Byram & Co., Detroit, Mich.

**Galvanized Material.**  
Jersey City Galvanizing Co., 112 John St., N. Y.

**Galvanizing and Tinning.**  
Wilcox, Crittenden & Co., Middletown, Conn.

**Gas Producers.**  
Wood, R. D. & Co., Philadelphia, Pa.

**Gas Stoves.**  
Bogliano Mfg. Co., Baltimore, Md.

**Gas & Steam Fitters' Supplies.**  
Leavitt Mch. Co., Orange, Mass.  
Fancoast, Henry B. & Co., Phila., Pa.

**Gate Hinges.**  
Wrightsville Hdw. Co., Wrightsville, Pa.

**Gear Cutters.**  
D. E. Whiton Mach. Co., New London, Conn.

**Gears.**  
Boston Gear Works, Boston, Mass.  
Lincoln Iron Works, Rutland, Vt.  
Poole, Robt. & Son Co., Baltimore, Md.  
U. S. Projectile Co., Brooklyn, N. Y.

**Glass Boards.**  
Canton Saw Co., Canton, O.  
Lutkin Rule Co., Saginaw, Mich.

**Glass Cutters.**  
Monce, S. G., Bristol, Conn.

**Glaziers' Points.**  
Shelton Co., Birmingham, Conn.

**Glue.**  
Baeder, Adamson & Co., Phila., Pa.  
Dodd, A. W. & Co., Gloucester, Mass.  
Russia Cement Co., Gloucester, Mass.

**Grate Guards.**  
Dow Wire Works Co., Louisville, Ky.

**Grinding Mills.**  
Foss Mfg. Co., Springfield, O.

**Grinding and Polishing Machines.**  
Cutter, Wood & Stevens, Boston, Mass.  
Diamond Mach. Co., Providence, R. I.  
Norton Emery Wheel Co., Worcester, Mass.

**Grindstone Dressing Machinery.**  
Blake & Johnson, Waterbury, Conn.

**Grindstones.**  
Cleveland Stove Co., Cleveland, O.

**Gun Implements.**  
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.

**Gunpowder, Makers of.**  
Lafin & Rand Powder Co., 29 Murray St., N. Y.

**Gymnasium Supplies.**  
Independent Electric Co., Chicago, Ill.

**Handles.**  
Cleveland Wood Turning Co., Cleveland, O.

**Hangers, Door.**  
Chicago Spring Butt Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Graham, John H. & Co., 113 Chambers Street, N. Y.  
Lane Bros., Poughkeepsie, N. Y.

**Hardware Comm'n Merchants.**  
Graham, John H. & Co., 111 Chambers St., New York.  
Jacobus, W. H., 90 Chambers, N. Y.

**Hardware Drawers.**  
Wernicke Co., Minneapolis, Minn.

**Hardware Jobbers.**  
White, Van Gahn & Co., 15-17 Chatman Square, N. Y.

**Hardware Manufacturers.**  
Allentown Hardware Works, Allentown, Pa.  
Miller Falls Co., 93 Reade St., N. Y.  
Stearns, E. C. & Co., Syracuse, N. Y.  
Streeter, N. R. & Co., Groton, N. Y.  
Supple Hdw. Co., Phila., Pa.  
Union Mfg. Co., 103 Chambers, N. Y.  
Yale & Towne Mfg. Co., Stamford Conn.

**Hardware Mfrs. Agents.**  
Singham, W. Co., Cleveland, O.  
Clarke, Thomas, St. John, N. B.  
Graham, John H. & Co., 113 Chambers, Sickles, Sweet & Lyon, 35 Barclay, N. Y.

**Hardware Specialties.**  
Acme Shear Co., Bridgeport, Conn.  
Borger Bros., Philadelphia, Pa.  
Enterprise Mfg. Co., Philadelphia, Pa.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Johnson, S. C., Racine, Wis.  
North Bros. Mfg. Co., Philadelphia, Pa.  
Scranton & Co., New Haven, Conn.  
Union Lock & Hdw. Co., Lancaster, Pa.  
Wilson, J. Fred., Worcester, Mass.  
Wrightsville Hdw. Co., Wrightsville, Pa.

**Harness Snaps.**  
Covert Mfg. Co., West Troy, N. Y.  
Covers' Saddlery Wks., Farmer, N. Y.  
Fitch, W. & E. T., New Haven, Conn.

**Hay Tools.**  
Myers, F. E. & Bro., Ashland, O.

**Hoos.**  
Iowa Farming Tool Co., Ft. Madison, Iowa  
Withington & Cooley Mfg. Co., Jackson, Mich.

**Hog Rings and Ringers.**  
Oakes & Irwin, Decatur, Ill.

**Hoisting Machines.**  
Box, Alfred & Co., 314 Green, Phila.  
Brown Hoisting & Conveying Mch. Co., Cleveland, Ohio.  
Byers, Jno. F. Mch. Co., Ravenna, O.  
Fulton Iron & Engine Wks., Detroit, Mich.  
Harrington, E. Son & Co., Phila.  
Lidgerwood Mfg. Co., 96 Liberty, N. Y.  
Lincoln Iron Works, Rutland, Vt.  
McCoy, Jos. F. & Co., 26 Warren St.  
Marls & Beekley, Philadelphia.  
Moore Mfg. & Fdy. Co., Milwaukee, Wis.  
Morse, Williams & Co., Phila.  
Sellers, Wm. & Co., Phila. and N. Y.  
Speldel, J. G., Reading, Pa.  
Yale & Towne Mfg. Co., Stamford, Ct.

**Hollow Ware.**  
Avery Stamping Co., Cleveland, O.  
Bronson Supply Co., Cleveland, Ohio.  
Cleveland Stamping & Tool Co., Cleveland, O.  
Stuart & Peterson Co., Phila., Pa.

**Horse Clippers.**  
Gillette Clipping Machine Co., 201 E. 23d St., N. Y.

**Horse Nails, Makers of.**  
Capewell Horse Nail Co., Hartford, Conn.  
National Horse Nail Co., Vergennes, Vt.  
Putnam Nail Co., Neponset, Boston, Mass.

**Horse and Mule Shoes, Makers of.**  
Bryden Horse Shoe Co., Catsaqua, Pa.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Leonard, J., 446 West St., N. Y.  
Old Dominion Iron & Nail Works Co., Richmond, Va.  
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.  
Rhode Island Perkins Horse Shoe Co., Providence.  
Shoenberger & Co., Pittsburgh, Pa.  
Standard Horse Shoe Co., Boston, Mass.

**Hose.**  
Cleveland Rubber Works, Cleveland, O.  
N. Y. Belling & Packing Co., Ltd., 15 Park Row, N. Y.

**Hydrants, &c.**  
McLean, John, 296 & 298 Monroe, N. Y.

**Hydraulic Forging.**  
U. S. Projectile Co., Brooklyn, N. Y.

**Hydraulic Jacks.**  
Dudgeon, Richard, 24 Columbia, N. Y.  
McCoy, Jos. F. Co., 26 Warren St., N. Y.

**Hydraulic Machinery.**  
Wood, Wm. H., Media, Pa.

**Ice Cream Freezers.**  
White Mountain Freezer Co., Nashua, N. H.

**Injectors.**  
Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., New York.

**Insurance, Boiler.**  
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. & Co., Phila., Pa.

**Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.

**Iron, Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Cunliffe, R. M., Phila., Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.

**Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lee, J. Tatnall & Co., Philadelphia.  
Phillips, J. J., 430 Walnut, Philadelphia.  
Phillips & Crane, Philadelphia, Pa.  
Wister, L. & R. &

Place, Geo., 145 Broadway, N. Y.  
 Pond, L. W. Mch. Co., Worcester, Mass.  
 Poole, Robt. & Son Co., Baltimore, Md.  
 Powell Planer Co., Worcester, Mass.  
 Prentiss Tool & Supply Co., N. Y.  
 Scranton Supply & Mchry. Co., Scranton, Pa.  
 Sellers, Wm. & Co., Phila.  
 Seyfert's Sons, L. F., Philadelphia, Pa.  
 Sigourney Tool Co., Hartford, Conn.  
 Skiptoe, J. & Co., Cincinnati, O.  
 Skow Flexible Shaft Co., Ltd., Phila.  
 Toomey, Frank, Philadelphia, Pa.  
 Walker Mfg. Co., Cleveland, O.  
 Wetherill, Robert & Co., Chester, Pa.  
 Wilson, W. A., Rochester, N. Y.

**Machinery for Hardware Manufacturers.**  
 Adt. Jno. & Son, New Haven, Conn.

**Machine Knives.**  
 Loring, Coes & Co., Worcester, Mass.  
 Loyd, John, 568-562 Water St., N. Y.  
 Simonds Mfg. Co., Fitchburg, Mass.

**Machine Screws.**  
 American Iron & Bolt Co., Cincinnati, Ohio.  
 Hubbell, Harvey, Bridgeport, Ct.  
 Rhode Island Tool Co., Providence, R.I.

**Machine Tools.**—See Machinery.  
**Machine Work.**  
 Pappin, J., 68th St. & 11th Ave., N. Y. City.

**Machinists' Scales.**  
 Coffin & Leighton, Syracuse, N. Y.  
 Starrett, L. S., Athol, Mass.

**Machinists' Tools and Supplies.**  
 King, J. M. & Co., Watford, N. Y.  
 Sellers, Wm. & Co., Inc., Phila.

**Manufacturing Sites.**  
 Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.

**Measuring Tapes.**  
 Lufkin Rule Co., Saginaw, Mich.

**Meat Choppers.**  
 Enterprise Mfg. Co., Philadelphia, Pa.

**Meat Cutters.**  
 North Bros. Mfg. Co., Philadelphia, Pa.

**Mechanical Instruction.**  
 Correspondence School of Mechanics, Scranton, Pa.

**Metals.**  
 Fearing, Wm. S., 100 Chambers, N. Y.  
 Hendricks Bros., 49 Cliff, N. Y.

**Metal Brokers.**  
 American Metal Co., N. Y.

**Metal Saws.**  
 Q. & C. Co., Chicago, Ill.

**Metallurgists.**  
 Britton, J. Blodgett, Phila., Pa.

**Mining Knives.**  
 Palmer Hdw. Mfg. Co., Troy, N. Y.  
 Streeter, N. R. & Co., Groton, N. Y.

**Mine Lamps.**  
 Darby, Edw. & Sons, Phila., Pa.  
 Leonard, B. E., Scranton, Pa.

**Mining Screens.**  
 Harrington & King Perforating Co., Chicago, Ill.  
 Howard & Morse, 45 Fulton, N. Y.

**Mining Machinery.**  
 Allis, E. P. Co., Milwaukee, Wis.

**Models, Makers of.**  
 Ideal Machine Works, Hartford, Conn.

**Molding Sand.**  
 Obermayer, S. Co., Cincinnati, O.

**Motors, Water and Electric.**  
 Bolgiano Mfg. Co., Baltimore, Md.  
 C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.  
 Dallett, Thomas H. & Co., Phila., Pa.

**Nail Machinery.**  
 Pittsburgh Mfg. Co., Pittsburgh, Pa.

**Nail and Tack Pullers.**  
 Am. Specialty Co., Hartford, Conn.  
 Scranton & Co., New Haven, Conn.

**Nails (Cut) and Spikes.**  
 Borden & Lovell, 70 West, N. Y.  
 Pottstown Iron Co., Pottstown, Pa.  
 Riverside Iron Wks., Wheeling, W. Va.  
 Valley Steel Co., St. Louis, Mo.

**Nickel Plated Supplies.**  
 Eddy Electric Mfg. Co., Windsor, Conn.

**Norway Shapes, Rollers of.**  
 Rowland, William & Harvey, Frankford, Philadelphia.

**Novelty Manufacturers.**  
 Ideal Machine Works, Hartford, Conn.

**Nut Machines.**  
 Dunham Nut Co., Unionville, Ct.

**Nuts, Bolts, &c., Makers of.**  
 American Bolt Co., Lowell, Mass.  
 American Iron & Bolt Co., Cincinnati, Ohio.  
 American Screw Co., Providence, R.I.  
 Blake & Johnson, Waterbury, Conn.  
 Dunham Nut Co., Unionville, Conn.  
 Haskell, Wm. H. Co., Pawtucket, R.I.  
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.  
 Pennsylvania Bolt & Nut Co., Lebanon, Pa.  
 Port Chester Bolt & Nut Co., Port Chester, N. Y.  
 Rhode Island Tool Co., Providence, R.I.  
 Russell, Burdall & Ward, Port Chester, N. Y.  
 Sternbergh, J. H. & Son, Reading, Pa.  
 Wilson, J. Fred., Worcester, Mass.  
 Wm. H. Haskell Co., Pawtucket, R.I.

**Oilers.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

**Oil Heaters.**  
 Parker, Chas. Co., Meriden, Conn.

**Oilless Anti-Friction Metals.**  
 North American Metalline Co., Long Island City, N. Y.

**Oil Stones.**  
 Pike Mfg. Co., Pike Station, N. H.

**Ores.**

Wister, Francis, Philadelphia, Pa.

**Ox Shoes.**

Scranton Forging Co., Scranton, Pa.

**Packing.**

Morrison, Robert, St. Louis, Mo.  
 N. Y. Belting & Packing Co., Ltd., N. Y.

**Padlocks.**  
 Ames Sword Co., Chicopee, Mass.  
 Frain, E. T., Lancaster, Pa.  
 Union Lock & Hdw. Co., Lancaster, Pa.  
 Wolf, W. & L., Phila., Pa.

**Pails.**  
 Richmond Cedar Wks., Richmond, Va.

**Paint.**  
 Garry Iron & Steel Roofing Co., Cleveland, O.

**Paint Burners.**  
 Dangler Stove & Mfg. Co., Cleveland, Ohio.

**Paint Cans.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

**Pants Stretcher.**  
 Covert Mfg. Co., West Troy, N. Y.

**Patent Solicitors.**  
 Butler, C. N., Phila., Pa.  
 Jenner, H. W. T., Washington, D. C.  
 Howson & Howson, Philadelphia and Washington.  
 Stocking, E. B., Washington, D. C.

**Pattern Letters.**  
 Wells, Heber, 157 William St., N. Y.

**Perforated Metal.**  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Harrington & King Perforating Co., Chicago, Ill.  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

**Phosphor Bronze.**  
 Phosphor Bronze Smelting Co., Limited, Philadelphia.

**Phosphor Tin.**  
 Crescent Phosphorized Metal Co., Philadelphia, Pa.  
 Halk & Naumann, 616 Pearl, N. Y.

**Picks and Mattocks.**  
 Plumb, Fayette R., Philadelphia, Pa.

**Pig Iron.**  
 Houston, C. B. & Co., Philadelphia, Pa.  
 Montour Iron & Steel Co., Danville, Pa.  
 Naylor & Co., 45 Wall, N. Y.  
 Pilling & Crane, Philadelphia, Pa.  
 Samuel, Frank, Philadelphia, Pa.

**Pig Iron Storage.**  
 Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

**Pile Drivers.**  
 Vulcan Iron Works, Chicago, Ill.

**Pipe, Bent.**  
 National Pipe Bending Co., New Haven, Conn.

**Pipe Cutting and Threading Machines.**  
 Armstrong Mfg. Co., Bridgeport, Conn.  
 Bignall & Keeler Mfg. Co., St. Louis, Mo.  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 Merrill Mfg. Co., Toledo, O.  
 Penast, Henry B. & Co., Phila.  
 Saunders's Sons, D., Yonkers, N. Y.  
 Walworth Mfg. Co., Boston, Mass.

**Pipe Grips.**  
 Prentiss Vise Co., 44 Barclay, N. Y.

**Pipes, Fittings, &c., Makers of.**  
 McNab & Harlin Mfg. Co., N. Y.

**Pipe, Water and Gas, Makers of.**  
 Donaldson Iron Co., Emaus, Pa.  
 Riverside Iron Works, Wheeling, W. Va.  
 Wood, R. D. & Co., Philadelphia, Pa.

**Plane Irons, Manufacturers of.**  
 Burns Bros., Millbury, Mass.  
 Buck, Chas., Millbury, Mass.

**Planers.**  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 New Haven Mfg. Co., New Haven, Conn.  
 Pond, L. W. Mch. Co., Worcester, Mass.  
 Powell Planer Co., Worcester, Mass.  
 Wilson, W. A., Worcester, Mass.

**Planes, Manufacturers of.**  
 Stanley Rule & Level Co., N. Y.

**Plated Ware.**  
 Boardman, L. & Son, New Haddam, Ct.  
 Holmes & Edwards Silver Co., Bridgeport, Conn.  
 Rogers, Wm. Mfg. Co., Hartford, Ct.

**Plate, Iron and Steel, Mfrs. of.**  
 Aetna-Standard Iron & Steel Co., Bridgeport, O.  
 Lukens Iron & Steel Co., Coatesville, Pa.  
 Mahoning Valley Iron Co., Youngstown, Ohio.  
 Moorhead-McLean Co., Pittsburgh, Pa.  
 McIlvain & Sons, Reading, Pa.  
 Pottstown Iron Co., Pottstown, Pa.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Singer, Nickick & Co., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Wood, Alan Co., Philadelphia, Pa.

**Plating, Nickel, Brass and Silver.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

**Polishing Machines.**  
 Watson & Stillman, 204 E. 43d, N. Y.

**Post Hole Diggers.**

Gibbs Mfg. Co., Canton, Ohio.  
 Kohler, F. E. & Co., Canton, O.

**Poultry Nettings.**

Barum, E. T., Detroit, Mich.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.

**Wire Cloth Co., Trenton, N. J., "Silver Finish."**

**Tyler Wire Works Co., W. S., Cleveland, O.**

**Wright & Colton Wire Cloth Co., Worcester, Mass.**

**Powder.**  
 Laffin & Rand Powder Co., 29 Murray, New York Powder Co., 62 Liberty St., N. Y.

**Power Hammers.**  
 Denelt & Eisenhardt, Philadelphia.  
 Dupont Mfg. Co., St. Johnsbury, Vt.  
 Jenkins & Lingie, Bellefonte, Pa.  
 Miner & Peck Mfg. Co., New Haven, Conn.  
 Scranton & Co., New Haven, Conn.

**Power Transmitting Machinery.**  
 Dodge Mfg. Co., Mishawaka, Ind.

**Presses, Dies, &c.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Mch. Co., Waterbury, Ct.

**Presses, Power, Makers of.**  
 Bliss, E. W. Co., Brooklyn, N. Y.  
 Manville, E. J. Mch. Co., Waterbury, Ct.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

**Printing and Embossing.**  
 Griffith, Axtell & Cady Co., Holyoke, Mass.

**Pulleys.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Dodge Mfg. Co., Mishawaka, Ind.  
 Keystone Clutch Mch. Wks., Phila., Pa.  
 Reading Wood Pulley Co., Reading, Pa.

**Pumping Machinery.**  
 Dean Bros. Steam Pump Works, Indianapolis, Ind.  
 Goulds Mfg. Co., Seneca Falls, N. Y.  
 Hooker-Colville Steam Pump Co., St. Louis, Mo.  
 McGowan, J. H. & Co., Cincinnati, O.  
 Maslin, J. & Son, Jersey City, N. J.  
 Norwalk Iron Works Co., So. Norwalk, Conn.

**Southwark Fdy. & Mch. Co., Phila., Pa.**

**Valley Pump Works, Easthampton, Mass.**

**Worthington, Henry R., 86 and 88 Liberty St., N. Y.**

**Pump Leathers.**  
 Detroit Valve & Washer Co., Detroit, Mich.

**Pumps, Makers of.**  
 Deming Co., Salem, O.  
 Douglas, W. & B., Middletown, Conn.  
 Goulds Mfg. Co., Seneca Falls, N. Y.  
 Myers, F. E. & Bro., Ashland, O.

**Punches.**  
 Richards, I. P., Providence, R. I.

**Punches and Shears, Hand and Power.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.  
 Watson & Stillman, 204 E. 43d, N. Y.

**Rails, Old and New.**  
 Perry, W. H. & Co., Providence, R. I.

**Rat and Mouse Traps.**  
 Burditt & Williams, Boston, Mass.  
 Estey, W. S., 65 Fulton, N. Y.  
 Excelsior Cutlery Co., Worcester, Mass.

**Razors, Manufacturers of.**  
 Millbury Razor Co., Millbury, Mass.

**Re-Seating Machines.**  
 Leavitt Mch. Co., Orange, Mass.

**Reducing Valves.**  
 D'Este & Seeley Co., Boston, Mass.

**Reels.**  
 Hendryx, A. B. Co., New Haven, Conn.

**Refrigerator Door Fasteners.**  
 Conroy, P. J. & Co., Philadelphia.

**Refrigerators.**  
 Wisconsin Refrigerator Co., Eau Claire, Wis.

**Rivets.**  
 Blake & Johnson, Waterbury, Conn.  
 Burden Iron Co., Troy, N. Y.  
 Clark & Cowles, Plainville, Conn.  
 Cobb & Drew, Plymouth, Mass.  
 Sternbergh, J. H. & Son, Reading, Pa.  
 Townsend, W. P. & Co., New Brighton, Pa.

**Riveting Machines.**  
 Adt. Jno. & Sons, New Haven, Conn.

**Rolling Mill Machinery.**  
 Birmingham Iron Fdry, Birmingham, Conn.  
 Booth, The Lloyd Co., Youngstown, O.  
 Leeburg Foundry & Mch. Co., Pittsburgh, Pa.  
 Morgan Construction Co., Worcester, Mass.  
 Robinson-Rea Mfg. Co., Pittsburgh.  
 Totten & Hogg Iron and Steel Fdry. Co., Pittsburgh, Pa.  
 Trethewey Mfg. Co., Pittsburgh, Pa.  
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

**Rolls, Chilled, Sand and Steel**

Birmingham Iron Foundry, Birmingham, Conn.

Booth, The Lloyd Co., Youngstown, O.  
 East Chicago Fdry Co., Chicago, Ill.

Garrison, A. Fdry Co., Pittsburgh, Pa.  
 Robinson-Rea Mfg. Co., Pittsburgh, Pa.  
 Seaman, Sneath & Black, Pittsburgh.  
 Totten & Hogg Iron and Steel Fdry. Co., Pittsburgh, Pa.

**Roofing.**  
 Berlin Iron Bridge Co., E. Berlin, Conn.  
 Cincinnati Corrugating Co., Piqua, O.  
 N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.

**Rope and Web Goods.**  
 Covert Mfg. Co., West Troy, N. Y.  
 Covert's Saddlery Wks., Farmer, N. Y.

**Rope Wheels.**  
 Cresson, Geo. V. Co., Philadelphia, Pa.

**Rubber Goods.**  
 Canfield, H. O., Bridgeport, Conn.

**Rules, Manufacturers of.**  
 Stanley Rule & Level Co., 29 Chambers.  
 Stephens & Co., Riverton, Conn.

**Sad Irons.**  
 Enterprise Mfg. Co., Phila., Pa.  
 Streeter, N. R. & Co., Groton, N. Y.

**Sad Irons, Gas.**  
 Bolgiano Mfg. Co., Baltimore, Md.

**Sand Paper.**  
 Baeder, Adamson & Co., Phila., Pa.

**Sash Balances.**  
 Caldwell Mfg. Co., Rochester, N. Y.  
 Pullman Sash Balance Co., Rochester, N. Y.

**Sash Cords and Chains.**  
 Morton, Thos., 65 Elizabeth, N. Y.  
 Samson Cordage Works, Boston, Mass.  
 Smith & Egge Mfg. Co., Bridgeport.

**Sash Pulleys.**  
 Palmer Hardware Mfg. Co., Troy, N. Y.

**Sash Weights.**  
 Brown, E. E. & Co., Philadelphia, Pa.  
 Kings County Iron Foundry, Brooklyn, N. Y.  
 Norton Bros., Chicago, Ill.

**Saw Filing Machines.**  
 Disston, Henry & Sons, Philadelphia, Pa.

**Saws, Makers of.**  
 Atkins, E. C. & Co., Indianapolis, Ind.  
 Disston, Henry & Sons, Phila., Pa.  
 National Saw Co., Newark, N. J.  
 Simonds Mfg. Co., Fitchburg, Mass.

**Saw Sets.**  
 Taintor Mfg. Co., 84-86 Chambers, N. Y.

**Saw Vises.**  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**Sawing Machines.**  
 Q. & C. Co., Chicago, Ill.

**Scales, Manufacturers of.**  
 Buffalo Scale Co., Buffalo, N. Y.  
 Chatillon, John & Sons, 85-89 Cliff, N. Y.  
 Standard Scale & Fixtures Co., St. Louis, Mo.

**Scrapers, Road.**  
 Sidney Steel Scraper Co., Sidney, O.

**Screens, Coal and Ore.**  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

**Screw Cutting Machinery.**  
 Wells Bros. & Co., Greenfield, Mass.  
 Wiley & Russell Mfg. Co., Greenfield, Mass.

**Screw Drivers.**  
 Brown, R. H. & Co., New Haven, Conn.  
 Mayhew, H. H. Co., Shelburne Falls, Mass.

**Screw Machinery.**  
 Hartford Machine Screw Co., Hartford, Conn.

**Screw Plate and Pipe Cutter.**  
 Jarecki Mfg. Co., Erie, Pa.

**Screws, Makers of.**  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Wm. H. Haskell Co., Pawtucket.  
 Miles, F. S., 205 Quarry, Philadelphia.  
 Reynolds & Co., New Haven, Conn.  
 Worcester Machine Screw Co., Worcester, Mass.

**Scroll Saws.**  
 Barnes, W. F. & John, Rockford, Ill.  
 Millers Falls Co., 93 Reade St., N. Y.  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**Scythe Stones and Whetstones.**  
 Pike Mfg. Co., Pike Stat'n, N. H.  
 Cleveland Stone Co., Cleveland, O.

**Shafting, Makers of.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Cresson, Geo. V. Co., Philadelphia, Pa.  
 Fairmount Mch. Co., Philadelphia, Pa.  
 Sellers, Wm. & Co., Inc., Phila., Pa.  
 Stow Mfg. Co., Binghamton, N. Y.

**Shaped Iron and Steel, Manufacturers of.**  
 Aetna-Standard Iron & Steel Co., Bridgeport, O.  
 East Chicago Fdry Co., Chicago, Ill.

Allentown Rolling Mill, Allentown, Pa.  
Lockhart Iron & Steel Co., Pittsburgh, Pa.  
Passaic Rolling Mill Co., Paterson, N.J.  
The Phoenix Iron Co., Phila., Pa.  
Pottsville Iron & Steel Co., Pottsville, Pa.  
Roberts, A. & P. & Co., Phila., Pa.

#### Shears and Scissors.

Acme Shear Co., Bridgeport, Conn.  
Clausen Shear Co., Fremont, Ohio.  
Heinrichs, R. Sons Co., Newark, N. J.

#### Sheet Iron and Steel, Manufacturers of.

Atina Standard Iron and Steel Co., Bridgeport, O.  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Mahoning Valley Iron Co., Livingston, Ohio.  
Morehead-McCleane Co., Pittsburgh, Pa.  
Pierson & Co., 29 Broadway, N. Y.  
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.  
The Mahoning Valley Iron Co., Youngstown, O.  
Alan Wood Co., Philadelphia.  
W. Dewees Wood Co., McKeesport, Pa.

#### Sheet Zinc.

Matthiessen & Hegeler Zinc Co., La Salle, Ill.

#### Shelf Brackets.

Atlas Mfg. Co., New Haven, Conn.  
Stanley Works, New Britain, Conn.

#### Shoe Stands.

Kupferle, Jno. C., St. Louis, Mo.

#### Shovels.

Peninsular Metal Works, Detroit, Mich.

#### Show Cases.

Union Show Case Co., Chicago, Ill.

#### Sinks.

Douglas, W. & B., Middletown, Conn.

#### Skate Grinding Machinery.

Perkins, Chas., Bridgewater, Mass.

#### Skates, Ice.

Barney & Berry, Springfield, Mass.  
Keene Mfg. Co., Keene, N. H.  
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.

#### Skates, Roller.

Henley, M. C., Richmond, Ind.  
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.

#### Slag Machines.

Cambria Iron Co., Johnstown, Pa.

#### Slaw Cutters.

Tucker & Dorsey Mfg. Co., Indianapolis, Ind.

#### Smelting Works.

Reeves, Paul S., 760 S. Broad, Phila.

#### Soldering Coppers.

Clendenin Bros., Baltimore, Md.  
Covert Mfg. Co., West Troy, N. Y.

#### Speaking Tubes.

Ostrander, W. R. & Co., 204 Fulton St., N. Y.  
Wollensak, J. F., Chicago, Ill.

#### Special Machinery.

Rhodes, L. E. Co., Hartford, Conn.

#### Spelter.

Matthiessen & Hegeler Zinc Co., La Salle, Ill.

#### Spoons and Forks.

Boardman, L. & Son, New Haddam, Conn.  
Holmes & Edwards Silver Co., Bridgeport, Conn.  
Rogers, The Wm. Mfg. Co., Hartford, Conn.

#### Sporting Goods.

Hartley & Graham, 313-315 B'way, N. Y.

#### Springs.

Clark & Cowles, Plainville, Ct.  
Colled Wire Belting Co., Jersey City, N. J.  
Dunbar Bros., Bristol, Conn.  
Miller & Van Winkle, Brooklyn, N. Y.  
Morgan Spring Co., Worcester, Mass.  
Roland, Wm. & Harvey, Phila., Pa.  
Sabin Machine Co., Montpelier, Vt.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.

#### Spring Hinges.

Bommer Bros., Brooklyn, N. Y.  
Chicago Spring Bolt Co., Chicago, Ill.  
Fullman Sash Balance Co., Rochester, N. Y.  
Stover Mfg. Co., Freeport, Ill.  
Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.

#### Stamping Works.

Avery Stamping Co., Cleveland, O.  
Cleveland Stamping & Tool Co., Cleveland, O.

#### Staples.

Cobb & Drew, Plymouth, Mass.  
Titchener, E. H. & Co., Binghamton, N. Y.

#### Steam Gauges.

Bristol Co., Waterbury, Conn.  
Star Brass Mfg. Co., Boston, Mass.

#### Steam Hammers, &c., Makers of.

Dienelt & Eisenhart, Philadelphia.  
Dugdon, Richard, 24 Columbia Street, N. Y.  
Tretlow Mfg. Co., Pittsburgh, Pa.  
Wood, Wm. H., Media, Pa.

#### Steam Heating & Oil Separators.

Webster, Warren & Co., Camden, N. J.

#### Steam Separators.

Harrison Safety Boiler Wks., Phila., Pa.  
Webster, Warren & Co., Camden, N. J.

#### Steam Specialties.

D'Este & Seeley Co., Boston, Mass.  
Lunkenheimer Co., Cincinnati, O.

#### Steam Traps.

D'Este & Seeley Co., Boston, Mass.

#### Steel, Cold Rolled Strip.

Superior Steel Co., Pittsburgh, Pa.  
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

#### Steel Figures and Alphabet.

Hoefig, C. W., 52 Fulton St., N. Y.  
Krogerud, W., 61 Fulton St., N. Y.

#### Steel Importers.

Abbott, Wheelock & Co., N. Y. and Boston.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.  
Milne, A. & Co., 1 Broadway, N. Y.  
Newton & Shipman, 83 John, N. Y.  
Wetherell Bros., 93 Liberty St., N. Y.  
Whitney, A. R. & Co., B'way, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

#### Steel (Mushet's Special).

Jones, E. M. & Co., Boston.

#### Steel Manufacturers.

Atina Standard Iron & Steel Co., Bridgeport, O.  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Baker, Hermann & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.  
Chester Steel Castings Co., Phila., Pa.  
Chrome Steel Works, Brooklyn, N. Y.  
Crescent Steel Co., Pittsburgh, Pa.  
Frankford Steel Co., Philadelphia.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.  
Kayser, Ellison & Co., Sheffield, Eng.  
La Belle Steel Co., Pittsburgh, Pa.  
Landon Iron Co., Salisbury, Conn.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Moorhead-McCleane Co., Pittsburgh, Pa.  
Moss, F. W., 83 John, N. Y.  
Pottsville Iron and Steel Co., Pottsville, Pa.  
Bowland, Wm. & Harvey, Frankford, Pa.  
Singer, Nimick & Co., Pittsburgh, Pa.  
Superior Steel Co., Pittsburgh, Pa.  
Valley Steel Co., St. Louis, Mo.  
Wordlaw, S. & Co., Sheffield, Eng.  
Wetherell Bros., 93 Liberty, N. Y.  
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

#### Steel, Manufacturers' Agents.

Barnis, G. K. & Co., Philadelphia, Pa.  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Lindsay, Jas. G. & Co., Phila., Pa.  
Pierson & Co., 29 Broadway, N. Y.

#### Steel Rails, Manufacturers of.

Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Iron Co., Johnstown, Pa.  
Montour Iron & Steel Co., Danville, Pa.  
Riverside Iron Wks., Wheeling, W. Va.

#### Steel Tool.

Frankford Steel Co., Philadelphia, Pa.  
Jessop, Wm. & Sons, Sheffield, England, 91 John, N. Y.  
Jones, B. M. & Co., Boston, Mass.  
La Belle Steel Co., Pittsburgh, Pa.

#### Step Ladders, Rolling.

Bicycle Step Ladder Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Croissant, M., Albany, N. Y.

#### Stocks and Dies.

Armstrong Mfg. Co., Bridgeport, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Butterfield & Co., Derby Line, Vt.  
Hart Mfg. Co., Cleveland, O.  
Oster Mfg. Co., Cleveland, O.  
Saunders' Sons, D., Yonkers, N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

#### Stone Saws and Planers.

Lincoln Iron Works, Rutland, Vt.

#### Store Fixtures.

Wernicke Co., Minneapolis, Minn.

#### Stove Linings.

Ostrander Fire Brick Co., Troy, N. Y.

#### Stove Pipe Thimbles.

Cheney, S. & Son, Manlius, N. Y.

#### Stove Trucks.

Tucker & Dorsey Mfg. Co., Indianapolis, Ind.

#### Street Lamps.

Steam Gauge & Lantern Co., Syracuse, N. Y.

#### Structural Iron Work.

Berlin Iron Bridge Co., East Berlin, Conn.  
Lindsay, Jas. G. & Co., Phila., Pa.

#### Structural Tubing.

National Structural Tubing Co., Potter Bldg., N. Y.

#### Sulphuric Acid.

Matthiessen & Hegeler Zinc Co., La Salle, Ill.

#### Tacks, Brads, Staples, &c.

Atlas Tack Corporation, Boston, Mass.  
Chess Bros., Pittsburgh, Pa.  
Clendenin Bros., Baltimore, Md.  
Cobb & Drew, Plymouth, Mass.  
Grand Crossing Tack Co., Grand Crossing, Ill.

#### Tack and Nail Machinery.

Kimball Bros. & Co., Brockton, Mass.  
Sweetser, W. A., Brockton, Mass.

#### Tanks.

Stuart & Peterson Co., Phila., Pa.

#### Taps and Dies.

Butterfield & Co., Derby Line, Vt.  
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.  
Manning, Maxwell & Moore, 111 Liberty St., N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

#### Testing Laboratories.

Riehle Bros. Testing Mach. Co., Philadelphia.

#### Testing Machines.

Riehle Bros. Testing Mach. Co., Phila.

#### Theatrical Hardware.

Wollensak, J. F., Chicago, Ill.

#### Thill Springs.

Frost Thill Spring Co., Boston, Mass.  
Sabin Machine Co., Montpelier, Vt.

#### Thrust Collars.

Gouverneur Mach. Co., Gouverneur, N. Y.

#### Time Record.

Scattergood, H. W., Phila., Pa.

#### Tin Plate Machinery.

Lloyd Booth Co., Youngstown, Ohio.

#### Tire Upsetters.

Butts & Ordway, Boston, Mass.

#### Toe Calks, Steel.

Burke, P. F., Boston, Mass.

#### Tool Chests.

Am. Tool Co., 200 W. Houston St., N. Y.

#### Tool Holders.

Armstrong Bros. Tool Co., Chicago, Ill.

#### Tools.

Brown, R. H. & Co., New Haven, Conn.  
Leavitt Mch. Co., Orange, Mass.  
Mayhew, H. H. Co., Shelburne Falls, Mass.  
Millers Falls Co., 93 Reade, N. Y.  
Richardson, C. F. & Son, Athol, Mass.  
Standard Tool Co., Athol, Mass.  
Stanley Rule & Level Co., 29 Chambers, St. Louis, Mo.  
Starratt, L. S., Athol, Mass.  
Stearns, E. C. & Co., Syracuse, N. Y.  
Stevens, J., Arms & Tool Co., Chicopee Falls, Mass.

#### Tools, Blacksmith and Wheelwright.

Buffalo Forge Co., Buffalo, N. Y.  
Butts & Ordway, Boston, Mass.  
Champion Blower & Forge Co., Lancaster, Pa.  
Cater Mfg. Co., Cleveland, Ohio.  
Plumb, Kaye & R., Philadelphia, Pa.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

#### Tools, Steam and Gas Fitters'.

Saunders' Sons, D., Yonkers, N. Y.

#### Torches, Oil and Gasoline.

Dangler Stove & Mfg. Co., Cleveland, O.  
Sander & Trenkamp Co., Cleveland, Ohio.  
Standard Lighting Co., Cleveland, O.

#### Tote Boxes.

Clark, W. J. & Co., Salem, O.

#### Tramway Lifters.

Wollensak, J. F., Chicago, Ill.

#### Tree Holders.

Allentown Hdw. Works, Allentown, Pa.  
Logan & Strowbridge Iron Co., New Brighton, Pa.

#### Trucks, Manufacturers of.

Clark, G. P., Windsor Locks, Conn.

#### Tubes, Seamless Drawn Copper.

Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Randolph & Clowes, Waterbury, Conn.

#### Tubes, Steel.

Avery Stamping Co., Cleveland, O.  
Leng's, John S. Son & Co., 4 Fletcher St., New York.  
U. S. Projectile Co., Brooklyn, N. Y.

#### Tubing, Structural.

National Structural Tubing Co., Potter Bldg., N. Y.

#### Tumbling Barrels.

Henderson Bros., Waterbury, Conn.

#### Turnbuckles.

Cleveland City Forge & Iron Co., Cleveland, O.  
Merrill Bros., Brooklyn, E. D.

#### Twist Drills, Makers of.

Cleveland Twist Drill Co., Cleveland, O.  
Morse Twist Drill & Machine Co., New Bedford, Mass.  
New Process Twist Drill Co., Taunton, Mass.  
Standard Tool Co., Cleveland.

#### Valves, Gas, Water and Steam.

Chapman Valve Mfg. Co., Boston.  
Eynon-Evans Mfg. Co., Philadelphia, Pa.

#### Ventilating Fans.

Perkins, B. F. & Son, Holyoke, Mass.

#### Ventilator Appliances.

Howard & Morse, 16 Fulton St., N. Y.

#### Vise Jaws.

Newark Mch. Tool Co., Newark, N. J.

#### Vises.

Hollands Mfg. Co., Erie, Pa.  
Howard Iron Works, Buffalo, N. Y.  
Millers Falls Co., 93 Reade St., N. Y.  
Parker, Chas. Co., Meriden, Conn.  
Prentiss Vise Co., 44 Barclay, N. Y.

#### Wagon Jacks.

Covert Mfg. Co., West Troy, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.

#### Washers.

Haskell, Wm. H. Co., Pawtucket, R. I.  
Milton Mfg. Co., Milton, Pa.  
Sternbergh, J. H. & Son, Reading, Pa.

#### Washing Machines.

Richmond Cedar Wks., Richmond, Va.

#### Water Meters.

Worthington, Henry R., 86 & 88 Liberty St., N. Y.

#### Water Wheels.

Pool, Robt. & Son Co., Balimore, Md.

#### Wheelbarrows.

Bryan Mfg. Co., Bryan, Ohio.  
Sidney Steel Scraper Co., Sidney, O.  
Whittington & Cooley Mfg. Co., Jackson, Mich.

#### Window Cord, Makers of.

Samson Cordage Works, Boston, Mass.

#### Wire, Manufacturers of.

Cincinnati Barb Wire Fence Co., Cincinnati, O.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Miller & Van Winkle, Brooklyn, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
New Haven Wire Mfg. Co., New Haven, Conn.  
Salem Wire Nail Co., Salem, O.  
Stewart Wire Co., Easton, Pa.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Wetherell Bros., 93 Liberty St., N. Y.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.

#### Wire Cloth.

Barnum, E. T., Detroit, Mich.  
Clinton Wire Cloth Co., Clinton, Mass.  
Darby, Edward & Sons, Philadelphia.  
Estley, W. S., 95 Fulton, N. Y.  
Gilbert & Bennett Mfg. Co., 42 Cliff, N. Y.  
Howard & Morse, 45 Fulton, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
N. J. Wire Cloth Co., Trenton, N. J.  
New York Wire Cloth Co., 102 Chambers St., N. Y.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.  
W. S. Tyler Wire Works Co., Cleve'd.

#### Wire Cutters.

Higginson Hdw. Co., Higginson, Conn.  
King, J. M. & Co., Watertown, N. Y.

#### Wire Dies.

McFarland, Wm., Trenton, N. J.  
Newton & Shipman, 83 John St., N. Y.

#### Wire Dowels.

Bond Nail Co., Raynham, Mass.

#### Wire Fences, See Fencing, Iron and Wire.

#### Wire Goods, Manufacturers of.

Darby, Edward & Sons, Phila.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Ludlow-Saylor Wire Co., St. Louis  
New York Wire Cloth Co., 102 Chambers St., N. Y.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Williamson, C. T., Wire Novelty Co., Newark, N. J.  
Wire Goods Co., Worcester, Mass.

#### Wire Hangers.

Barber-Koenig Mfg. Co., Hazleton, Pa.

#### Wire Machinery.

Am. Tool Wks., Cleveland, O.  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Morgan Construction Co., Worcester, Mass.  
Waterbury Mch. Co., Waterbury, Conn.

#### Wire Nails.

Indiana Wire Fence Co., Crawfordsville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
Salem Wire Nail Co., Salem, O.  
Taunton Wire Nail Co., Taunton, Mass.  
Whitney, A. R. & Co., New York City.

#### Wire Rods



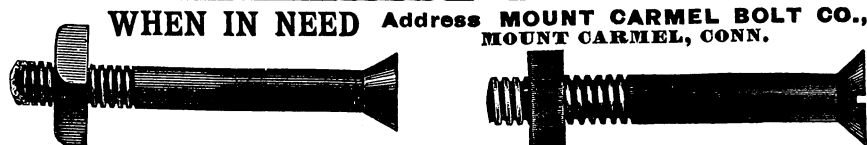
# ALPHABETICAL INDEX TO ADVERTISERS.

Abbott, Wheelock & Co.....	17	Bronson Supply Co.....	76	Crawford Mfg. Co.....	75	Goulds Mfg. Co.....	35
Acome Shear Co.....	71	Brown, A. & F.....	48	Crescent Horse Shoe & Iron Co.....	89	Gouverneur Machine Co.....	48
Adt, John & Son.....	43	Brown, E. E. & Co.....	84	Crescent Phosphorized Metal Co.....	3	Graham, John H. & Co.....	78
Etna-Standard Iron & Steel Co.....	19	Brown Holsting & Conveying Mch. Co.....	35	Crescent Steel Co.....	19	Grand Crossing Tack Co.....	12
Alken, Henry.....	25	Brown, R. H. & Co.....	92	Cresson, Geo. V. Co.....	48	Grand Rapids Cycle Co.....	75
Alexander Bros.....	36	Bryan Mfg. Co.....	93	Croissant, M.....	81	Grand Rapids Hand Screw Co.....	73
Allentown Hdw. Wks.....	56&79	Bryden Horse Shoe Co.....	87	Crosby, G. A. & Co.....	38	Green, A. H.....	76
Allentown Rolling Mills.....	20	Buck Bros.....	71	Crown Smelting Co.....	3	Griffith, Axtell & Cady Co.....	70
Allis, E. P. Co.....	27	Buck, Chas.....	71	Cunliffe, R. M.....	53	Haight & Clark.....	24
American Bolt Co.....	95	Buckeye Mfg Co.....	31	Cushman Chuck Co.....	48	Halk & Naumann.....	3
American Iron & Bolt Co.....	58	Buffalo Forge Co.....	104	Cutter, Wood & Stevens.....	48	Halsey, Jas. T.....	43
American Metal Co.....	3	Buffalo Scale Co.....	90	Dallett, Thos. H. & Co.....	45	Hamilton Machine Tool Co.....	39
American Pig Iron Storage Warrant Co.....	18	Buhl Stamping Co.....	77	Dame, Stoddard & Kendall.....	74	Hammer & Co.....	90
American Rubber Boat Co.....	58	Bullard Mch. Tool Co.....	51	D'Amour & Littledale.....	41	Hardware Board of Trade.....	55
American Screw Co.....	13	Burditt & Williams.....	63	Dangler Stove & Mfg. Co.....	78	Harrington, E., Son & Co.....	46
American Specialty Co.....	71	Burden Iron Co.....	87	Darby, Edw. & Sons.....	8	Harrington & King Perforating Co.....	9
American Tool Co.....	70	Burke, P. F.....	89	Davis, I. B. & Son.....	33	Harris, Wm. A. Steam Engine Co.....	30
American Tool Works.....	58	Burr & Houston Co.....	22	Davis, W. P.....	52	Harrison Safety Boiler Wks.....	31
Ames Sword Co.....	84	Butler, C. N.....	6	Davol, John & Sons.....	2	Hart Mfg. Co.....	43
Amidon Tool Corporation.....	70	Butterfield & Co.....	43	Dean Bros. Steam Pump Works.....	34	Hartford Machine Screw Co.....	50
Ansonia Brass & Copper Co.....	2	Butts & Ordway.....	38	Deltz, A. E.....	84	Hartford Steam Boiler Insp. and Ins. Co.....	28
Arcade File Works.....	68	Butze, Adolph.....	55	Deming Co.....	64	Hartley Graham.....	1
Arcade Malleable Iron Co.....	20	Byers, Jno. F. Mch. Co.....	55	D'Este & Seeley Co.....	29	Haskell, Wm. H. Co.....	90
Arcade Mfg. Co.....	80	Byram & Co.....	27	Detrick & Harvey Machine Co.....	47	Hazard Mfg. Co.....	6
Armstrong Bros. Tool Co.....	45	C. & C. Electric Co.....	28	Detroit Valve & Washer Co.....	34	Heinrich's R. Sons Co.....	71
Armstrong Mfg. Co.....	44	Caldwell Mfg. Co.....	84	Diamond Machine Co.....	49	Henderson Bros.....	22
Athol Machine Co.....	65	California Wire Works.....	6	Dienelt & Eisenhardt.....	40	Hendey Machine Co.....	60
Atkins, E. C. & Co.....	66	Cambria Iron Co.....	18&21	Dietz, Schumacher & Co.....	41	Hendricks Bros.....	2
Atlas Mfg. Co.....	104	Cambridge Iron & Steel Co.....	14	Dille & McGuire Mfg. Co.....	94	Hendrick Mfg. Co., Ltd.....	7
Atlas Tack Corporation.....	12	Canfield, H. O.....	36	Disston, Henry & Sons.....	67	Hendryx, A. B. Co.....	3
Avery Stamping Co.....	73	Canton Saw Co.....	65	Dixon, Jos., Crucible Co.....	36	Henley, M. C.....	94
Ayer, H. C. & Gleason Co.....	37	Capewell Horse Nail Co.....	88	Dodd, A. W. & Co.....	1	Herlick, J. A.....	26
Babcock & Wilcox Co.....	23	Carbon Steel Co.....	19	Dodge Mfg. Co.....	48	Hiert, T. & Son.....	3
Baeder, Adamson & Co.....	32	Carlin's Sons, Thomas.....	52	Donaldson Iron Co.....	22	Higginum Hdw. Co.....	65
Banker & White.....	69	Carpenter J. M. Tap & Die Co.....	103	Douglas, W. & B.....	64	Hill, Clarke & Co.....	54
Barber-Koenig Mfg. Co.....	75	Chadborne & Coldwell Mfg. Co.....	94	Dow Wire Works Co.....	7	Hobson, F., Seaman & Co.....	17
Bardsley, J.....	83	Chambers Bros. Co.....	96	Draper Machine Tool Co.....	52	Hoeft, C. W.....	66
Barns, O. K. & Co.....	21	Champion Blower & Forge Co.....	43	Dudgeon, Richard.....	41	Hoffman, J. W. & Co.....	16
Barnes, W. F. & John.....	38	Champion Iron Co.....	7	Dunbar Bros.....	4	Hogan, John L. & Co.....	18
Barnett, G. & H.....	69	Chapman Valve Mfg. Co.....	30	Dunham Nut Co.....	95	Hoggson & Pettis Mfg. Co.....	43
Barnum, E. T.....	7	Chatillon, John & Sons.....	76	Dupont Mfg. Co.....	37	Hollands Mfg. Co.....	65
Bass Foundry & Machine Works.....	31	Cheney, S. & Son.....	22	Durant, W. N.....	35	Holmes & Edwards Silver Co.....	72
Bay State Stamping Co.....	49	Chess Bros.....	22	Dwight Slate Machine Co.....	38	Hooker-Colville Steam Pump Co.....	34
Beaman & Smith.....	61	Chester Steel Casting Co.....	23	Eagle Anvil Works.....	65	Houston, C. B. & Co.....	16
Bement, Miles & Co.....	40	Chicago Fire Arms Co.....	75	Eagle Bicycle Mfg Co.....	103	Howard Iron Works.....	69
Bemis & Call Hardware & Tool Co.....	90	Chicago Spring Butt Co.....	83	East Chicago Foundry Co.....	22	Howard & Morse.....	7
Berger Bros.....	84	Chrome Steel Works.....	18	Eccles, Richard.....	35	Howson & Howson.....	6
Berlin Iron Bridge Co.....	10	Church, Isaac.....	96	Eddy Electric Mfg. Co.....	29	Hubbell, Harvey.....	95
Bethlehem Iron Co.....	21	Cincinnati Barb Wire Fence Co.....	11	Electric Construction & Supply Co.....	29	Hutchinson, F. S. Co.....	70
Bevin Bros. Mfg. Co.....	75	Cincinnati Corrugating Co.....	9	Enterprise Mfg. Co. of Pa.....	80	Ideal Machine Works.....	51
Bickford Drill & Tool Co.....	39	Claffen Mfg. Co.....	36	Estey, W. S.....	6	Ideal Mfg. Co.....	75
Bicycle Step Ladder Co.....	80	Clapp, E. D. Mfg. Co.....	85	Ette & Henger Mfg. Co.....	93	Independent Electric Co.....	75
Bigelow, C. R.....	53	Clapp, Geo. M.....	53	Etting, Edw. J.....	16	Indiana Wire Fence Co.....	7
Biggall & Keeler Mfg. Co.....	40	Clark, G. P.....	91	Eureka Cast Steel Co.....	104	Iowa Farming Tool Co.....	91
Billings & Spencer Co.....	90	Clark, W. J. & Co.....	85	Excelsior Needle Co.....	104	Jacobus, W. H.....	96
Bingham, W. Co.....	75	Clark & Cowles.....	5	Eynon-Evans Mfg. Co.....	27	Jarecki Mfg. Co.....	42
Birmingham Iron Foundry.....	22	Clarke, Thomas.....	70	F. & N. Mfg. Co.....	94	Jeffrey Mfg. Co.....	35
Bissell, E. Son & Co.....	55	Claus Shear Co.....	73	Fairmount Machine Co.....	47	Jenkins Bros.....	1
Blair Mfg. Co.....	93	Clendenin Bros.....	12	Fay, J. A. & Co.....	39	Jenkins & Lingle.....	38
Blake & Johnson.....	11	Cleveland Block Co.....	84	Fearing, Wm. S.....	2	Jenner, H. W. T.....	6
Bliss Co., E. W.....	37	Cleveland City Forge & Iron Co.....	1	Ferdinand L. W. & Co.....	63	Jersey City Galvanizing Co.....	14
Blount Mfg. Co.....	82	Cleveland Rubber Works.....	79	Fitch, W. & E. T.....	103	Jessop, Wm. & Sons.....	17
Boardman, L. & Son.....	71	Cleveland Stamping & Tool Co.....	79	Fitchburg Machine Works.....	35	Johnson, I. H., Jr., & Co.....	46
Boker, Hermann & Co.....	17	Cleveland Stone Co.....	48	Flint & Co.....	19	Jones, B. M. & Co.....	19
Bolzano Mfg. Co.....	77	Cleveland Twist Drill Co.....	45	Folding Paper Box Co.....	79	Jones, Jesse & Co.....	69
Bommer Bros.....	104	Cleveland Wood Turning Co.....	81	Foss Mfg. Co.....	38	Jones & Lamson Machine Co.....	60
Bond Nail Co.....	11	Clinton Wire Cloth Co.....	8	Fram, E. T.....	84	Kay, J. F.....	4
Boone, W. C. Mfg. Co.....	22	Cobb & Drew.....	83	Frankford Steel Co.....	18	Kayser, Ellison & Co.....	17
Booth, The Lloyd Co.....	27	Coburn Trolley Track Mfg. Co.....	83	Frost Thill Spring Co.....	89	Keeley, Jerome & Co.....	16
Borden & Lovell.....	11	Coes, Loring & Co.....	91	Fulton Iron & Engine Works.....	46	Keene Mfg. Co.....	74
Borgner, Cyrus.....	27	Coes Wrench Co.....	91	Gardner, Jas. & Son.....	27	Kennedy, Julian.....	26
Boston Casting Co.....	3	Coffin & Leighton.....	80	Garland Chain Co.....	15	Keys, W. W. & R. M. Co.....	3
Boston Gear Works.....	31	Colby Wringer Co.....	76	Garrison, A., Foundry Co.....	21	Keystone Clutch & Machine Works.....	43
Box, Alfred & Co.....	46	Coldwell Lawn Mower Co.....	94	Garry Iron & Steel Rfg. Co.....	14	Kilmer Mfg. Co.....	
Bradlee & Co.....	15	Coleman, J. A.....	55	Gartland Foundry Co.....	24	Kimball Bros. & Co.....	12
Brass Goods Mfg. Co.....	2	Conroy, P. J. & Co.....	54	Garvin Machine Co.....	53	King, J. M. & Co.....	69
Bridgeport Deoxidized Bronze & Metal Co.....	2	Continental Iron Works.....	51	Gautier Steel Department.....	14	Kings County Iron Foundry.....	91
Bridgeport Gun Implement Co.....	85	Corning, Edw. & Co.....	8	Gaylord, F. L. Co.....	8	Kohler, F. E. & Co.....	91
Briggs, Marvin.....	53	Correspondence School of Mechanics.....	61	Gibbs Mfg. Co.....	93		
Bristol Co.....	1	Cotton, Barclay W. & Co.....	15	Gilbert & Bennett, Mfg. Co.....	8		
Britton, J. Blodgett.....	25	Covert Mfg. Co.....	85	Gillette Clipping Machine Co.....	73		
Broderick & Bascom Rope Co.....	6	Covert's Saddlery Works.....	61	Goddard, Asa.....	38		
		Cox, Justice Jr.....	16	Goodell Co.....	72		
		Cramp, Wm. & Sons S. & E. B. Co.....	8	Goodell, J. W. Co.....	70		
		Cramp Metal Mfg. Co.....	3	Gould & Eberhardt.....	35		



Kretschmer, B. & Sons.....	27	New Haven Mfg. Co.....	40	Riverside Iron Works.....	19	Taunton Locomotive Mfg. Co.....	33
Krogerud, W.....	63	New Haven Wire Mfg. Co.....	6	Roberts, A. & P. & Co.....	13	Taunton Wire Nail Co.....	9
Kupferle, Jno. C.....	56	N. J. Wire Cloth Co.....	8	Roberts Mfg. Co.....	35	Thomas, W. H.....	56
La Belle Steel Co.....	20	New Process Twist Drill Co.....	45	Robinson-Rea Mfg. Co.....	21	Thomson, W. H. & Co.....	16
Lafin & Rand Powder Co.....	22	Newton & Shipman.....	17	Rogers, The Wm. Mfg. Co.....	72	Tiebout, W. & J.....	83
Landon Iron Co.....	21	N. Y. Belting & Packing Co.....	36	Rome Brass & Copper Co.....	2	Titchener, E. H. & Co.....	12
Lane Brothers.....	84	N. Y. Powder Co.....	23	Rowland, Wm. & Harvey.....	104	Tod, Wm. & Co.....	31
Laughlin, Alex. & Co.....	25	N. Y. Iron Roofing & Corrugating Co.	9	Russell, Burdall & Ward.....	104	Toomey, Frank.....	53
Lee, J. Tatnall & Co.....	20	N. Y. Wire Cloth Co.....	9	Russia Cement Co.....	63	Torrance Iron Co.....	24
Lean, D. R. Co.....	26	Nicholson File Co.....	69	Sabin Machine Co.....	5	Totten & Hogg Iron and Steel Fdry.	
League Cycle Co.....	103	Nicolls, Wheeler & Co.....	17	Salem Wire Nail Co.....	11	Co.....	22 & 23
Leavitt Machine Co.....	26	Niles Tool Works.....	54	Samson Cordage Works.....	1	Townsend, W. P. & Co.....	96
Le Count, C. W.....	89	North Bros. Mfg. Co.....	18 & 61	Samuel, Frank.....	15	Trenton Iron Co.....	4
Leechburg Foundry & Machine Co.....	22	North American Metalline Co.....	3	Saunders Sons, D.....	41	Trethewey Mfg. Co.....	25
Long's, Jno. S. Son & Co.....	104	Northampton Cutlery Co.....	72	Sawyer Hdw. & Supply Co.....	26	Trimont Mfg. Co.....	90
Leonard, B. E.....	90	Northampton Emery Wheel Co.....	49	Scattergood, H. W.....	51	Tucker & Dorsey Mfg. Co.....	79
Leonard, J.....	21	Norton Bros.....	85	Scheeler & Sons.....	5	Tyler Wire Works Co. W. S.....	60
Leschen, A. & Sons Rope Co.....	6	Norton Emery Wheel Co.....	49	Schneider & Trenkamp Co.....	77	Union Lock & Hdw. Co.....	83
Levi, Henry & Co.....	21	Norwalk Iron Works Co.....	34	Scott, Geo. M.....	26	Union Mfg. Co.....	44
Lidgerwood Mfg. Co.....	104	Oakes & Irwin.....	95	Scoville Mfg. Co.....	2	Union Metallic Cartridge Co.....	1
Lincoln Iron Works.....	39	Obermayer, S. Co.....	21	Scranton & Co.....	38	Union Show Case Co.....	70
Lindsay, Jas. G. & Co.....	16	Ogden & Wallace.....	21	Scranton Forging Co.....	87	U. S. Projectile Co.....	12 & 55
Link-Belt Engineering Co.....	38	Old Dominion Iron & Nail Works Co.	87	Scranton Supply & Machine Co.....	52	Valentine, M. D. & Bro. Co.....	27
Lockhart Iron & Steel Co.....	17	Oster Mfg. Co.....	44	Seaman, Sleeth & Black.....	22	Valley Pump Co.....	34
Logan & Strowbridge Iron Co.....	80	Ostrander Fire Brick Co.....	27	Sebastian Lathe Co.....	46	Valley Steel Co.....	1
Lovell, Jno. P. Arms Co.....	104	Ostrander, W. R. & Co.....	89	Sellers, Wm. & Co.....	47	Van Dorn Iron Works Co.....	7
Loyd, John.....	66	Otto Gas Engine Works.....	32	Seneca Falls Mfg. Co.....	46 & 66	Van Wagoner & Williams Hdw. Co.	104
Ludlow-Saylor Wire Co.....	7	Palmer & De Mooy Fdry. Co.....	23	Sessions Foundry Co.....	23	Vulcan Iron Works.....	25
Lufkin Rule Co.....	65	Palmer Hardware Mfg. Co.....	62	Seyfert's Sons, L. F.....	52	Walker Mfg. Co.....	24
Lukens Iron & Steel Co.....	15	Pancoast, Henry B. & Co.....	42	Shelton Co.....	12	Wallace Wm. H. & Co.....	21
Lundberg, Gustaf.....	18	Parker, Chas. Co.....	78	Shickle, Harrison & Howard Iron Co.	23	Walworth Mfg. Co.....	103
Lunkenheimer Co.....	30	Parsons, R. E. Co.....	24	Shoenberger & Co.....	86	Wardlow, S. & C.....	17
McCabe, J. J.....	52	Passaic Rolling Mill Co.....	19	Shultz Belting Co.....	1	Warner Lock Co.....	82
McCaffrey File Co.....	69	Peck, A. G. & Co.....	104	Sickels, Sweet & Lyon.....	77	Washburn & Moen Mfg. Co.....	4
McClure & Amsler.....	26	Peninsular Metal Works.....	64	Sidney Steel Scraper Co.....	93	Waterbury Brass Co.....	2
McCoy, Jos. F. Co.....	44	Penn Elevator Engineering Co.....	47	Sigourney Tool Co.....	39	Waterbury Farrel Foundry & Ma-	
McFarland, Wm.....	4	Pennsylvania Bolt & Nut Co.....	95	"Silver Finish".....	9	chine Co.....	44
McGowan, J. H. & Co.....	34	Pennsylvania Mch. Co.....	52	Silver Mfg. Co.....	90	Waterbury Machine Co.....	44
McIlvain, Wm. & Sons.....	16	Perkins, B. F. & Son.....	39	Simonds Mfg. Co.....	63	Watson & Stillman.....	41
McKay, Jas. & Co.....	15	Perkins, Chas.....	75	Singer, Nimick & Co.....	20	Webster, Warren & Co.....	30
McKinney Mfg. Co.....	83	Perry, W. H. & Co.....	54	Skinner Chuck Co.....	43	Wells Bros. & Co.....	44
McKinnon Dash & Hdw. Co., Ltd.....	87	Philadelphia Engineering Wks.....	26	Smith & Egge Mfg. Co.....	44	Wells, Heber.....	51
McLean, John.....	31	Phoenix Horseshoe Co.....	87	Smith, H. D. & Co.....	89	Wernicke Co.....	80
McNab & Harlin Mfg. Co.....	31	Phoenix Iron Co.....	15	Smith, J. D. Foundry Supply Co.....	23	Westwick, J. & Son.....	30
Machinists' Supply Co.....	53	Phosphor Bronze Smelting Co.....	3	Smith, Theo. V.....	78	Wetherell Bros.....	17 & 20
Mahoning Valley Iron Co.....	21	Pierson & Co.....	18	Smythe, S. R. Co., Inc.....	25	Whitell, Robt. & Co.....	103
Main Belting Co.....	38	Pike Mfg. Co.....	70	Sommer's Son, John.....	104	White, A. A. & Co.....	69
Manning, Maxwell & Moore.....	45	Pilling & Crane.....	16	Southwark Foundry & Machine Co.	30	White, L. & I. J. Co.....	71
Manville Machine Co., E. J.....	51	Pittsburgh Mfg. Co.....	36	Spedel & Roeper.....	47	White Mt. Freezer Co.....	61
Maris & Beekley.....	47	Pittsburgh Reduction Co.....	60	Spencer's I. S. Sons.....	23	White, Van Glahn & Co.....	76
Marlin, J. & Son.....	24	Place, Geo.....	52	Springfield Gas Engine Co.....	30	Whiting Foundry Equipment Co. ...	20
Matthiessen & Hegeler Zinc Co.....	2	Plumb, Fayette R.....	79	Standard Fdry. & Mfg. Co.....	23	Whitlock Coil Pipe Co.....	32
Maule, Francis I.....	58	Plume & Atwood Mfg. Co.....	2	Standard Horse Shoe Co.....	87	Whitney, A. R. & Co.....	18
Maurer, H. & Son.....	27	Pollock, W. B. & Co.....	31	Standard Lighting Co.....	76	Whiton, D. E. Mch. Co.....	43
Mayhew, H. H. Co.....	76	Pond, L. W. Mch. Co.....	56	Standard Scale & Fixtures Co. ....	55	Wickwire Bros.....	7
Merrill Bros.....	2	Poole, Robt. & Son Co.....	33	Standard Tool Co.....	45	Wilcox, Crittenden & Co.....	24
Merrill Mfg. Co.....	39	Pope Mfg. Co.....	61	Stanley Rule & Level Co.....	103	Wilcox & Howe Co.....	89
Miles, F. S.....	11	Popping, J.....	51	Stanley Works.....	83	Wiley & Russell Mfg. Co.....	42 & 104
Millbury Razor Co.....	71	Port Chester Bolt & Nut Co.....	95	Star Brass Mfg. Co.....	103	Williamson, C. T. Wire Nov. Co.....	75
Miller & Van Winkle.....	104	Pottstown Iron Co.....	18	Starrett, L. S.....	65	Willmot & Hobbs Mfg. Co.....	1
Millers Falls Co.....	62 & 104	Pottsville Iron & Steel Co.....	15	Steam Gauge & Lantern Co.....	76	Wilson, E. H. & Co.....	18
Milne, A. & Co.....	18	Powell Planer Co.....	40	Stearns, E. C. & Co.....	60	Wilson, John.....	70
Milton Mfg. Co.....	93	Pratt & Cady Co.....	108	Stephens & Co.....	103	Wilson, J. Fred.....	96
Miner & Peck Mfg. Co.....	40	Prentiss Tool & Supply Co.....	52	Stephoe, J. & Co.....	52	Wilson, W. A.....	40
Mohr, J. J.....	16	Prentiss Vise Co.....	64	Sterling Emery Wheel Co.....	49	Winslow, Sam'l, Skate Mfg. Co.....	74
Monce, S. G.....	75	Pullman Sash Balance Co.....	71	Sternbergh, J. H. & Son.....	96	Wire Goods Co.....	9
Montour Iron & Steel Co.....	21	Putnam Nail Co.....	88	Stevens, J. Arms & Tool Co.....	68	Wisconsin Refrigerator Co.....	58
Moore, Dr. Glendon E.....	60	Q. & C. Co.....	39	Steward & Romaine Mfg. Co., Ltd.	96	Wister, Francis.....	16
Moore Mfg. & Foundry Co.....	47	Quint, A. D.....	40	Stewart Wire Co.....	6	Wister, L. & R. & Co.....	21
Moore & White Co.....	49	Rainey, W. J.....	1	Stiles & Parker Press Co.....	27	Withington & Cooley Mfg. Co.....	92
Moorhead-McCleane Co.....	20	Randolph & Clowes.....	1	Stirling Co.....	32	Wolf, W. & L.....	84
Morgan Construction Co.....	4	Reading Hardware Co.....	83	Stirling Co.....	32	Wolf, R. H. & Co. Ltd.....	5
Morgan Spring Co.....	4	Reading Wood Pulley Co.....	49	Stocking, E. B.....	6	Wollensak, J. F.....	64, 85 & 89
Morrison, Robert.....	27	Reeves, Paul S.....	104	Storm Mfg. Co.....	64	Wood Alan & Co.....	16
Morse Twist Drill & Machine Co.....	45	Republic Press.....	38	Stover Mfg. Co.....	83	Wood, R. D. & Co.....	23
Morse, Williams & Co.....	47	Reynolds & Co.....	11	Stow Flexible Shaft Co.....	45	Wood, W. Deves Co.....	20
Morton, Thos.....	85	R.I. Perkins Horse Shoe Co.....	87	Stow Mfg. Co.....	45	Wood, Wm. H.....	41
Moseley Iron Bridge & Roof Co.....	9	Rhode Island Tool Co.....	1	Streeter, N. R. & Co.....	81	Worcester Mch. Screw Co.....	96
Mount Carmel Bolt Co.....	103	Rhodes, L. E. Co.....	51	Stuart & Peterson Co.....	62	Worthington, Henry R.....	34
Myers, F. E. & Bro.....	64	Rice Mfg. Co.....	25	Sturtevant, B. F. Co.....	40	Wright & Colton Wire Cloth Co.....	8
National Horse Nail Co.....	89	Richardson, C. F. & Son.....	63	Superior Steel Co.....	5	Wrightsville Hardware Co.....	61
National Pipe Bending Co.....	32	Richards, I. P.....	108	Supplee Hardware Co.....	94	Wurster, F. W. & Co.....	104
National Saw Co.....	66	Richmond Cedar Works.....	81	Sweetser, W. A.....	12	Wyman & Gordon.....	90
National Structural Tubing Co.....	12	Ridgway, Craig & Son.....	40	Swindell, W. & Bros.....	25	Yale & Towne Mfg. Co.....	46 & 63
National Wringer Co.....	80	Riehle Bros. Testing Machine Co.....	35	Syracuse Smelting Works.....	4		
Newark Machine Tool Works.....	60			Tablet & Ticket Co.....	51		
New Castle Wire Nail Co.....	11			Taintor Mfg. Co.....	68		
New Haven Copper Co.....	2			Talcott, W. O.....	35		
				Tanite Co.....	104		

Published by DAVID WILLIAMS, 96-102  
Reade Street, New York. Printed by  
THE WILLIAMS PRINTING CO., Gen-  
eral Book, Commercial and News-  
paper Printers and Binders, 96-102  
Reade St., New York.

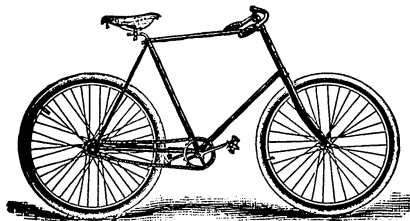


## OUR AGENTS MAKE MONEY.

We Make

Wheels to Sell and

Stay Sold.



THE EAGLE BICYCLE MFG. CO.,

TORRINGTON, CONN.

FIRST AND ONLY  
IN THE WORLD TO MAKE

## ALUMINUM RIMS AND CLINCHER TIRES.

THE PRATT & CADY CO.,

—MANUFACTURERS OF—

## IRON, BRASS, COMPOSITION AND BRONZE CASTINGS.

Special facilities enable us to execute orders promptly. Prices reasonable for high grade work.

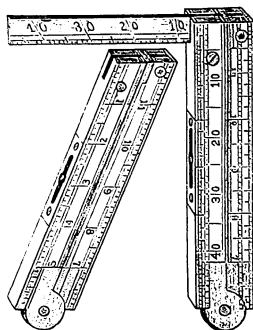
WILLIAM A. HARRIS, SELLING AGENT, - HARTFORD, CONN.

## U. S. STANDARD BOXWOOD AND IVORY RULES.



RIVERTON, CONN.,

and 80 Chambers St., New York.



WALWORTH MFG. CO., Boston, Mass.

STEAM, WATER AND GAS COODS IN ENDLESS VARIETY

—SEND FOR CATALOGUE.—

## PLUMBERS' AND FITTERS' TOOLS AND SUPPLIES.

Tools for cutting and threading Wrought Iron Pipe, Die Plates and Dies, Stillson Pipe Wrench, Miller's Ratchet Die Plate, Brass and Iron Valves and Cocks, Wrought Iron Pipe and general Machinists' Supplies.

## THE ART OF SELLING.

By F. B. GODDARD.

12mo, Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse, and tells how he masters men: but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character," with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

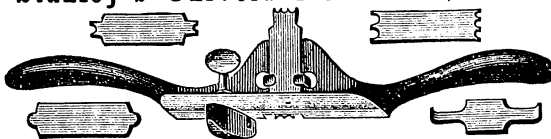
DAVID WILLIAMS, Publisher & Bookseller, 96-102 Reade St., N. Y.

IMPROVED  
Labor-Saving  
CARPENTERS'  
TOOLS.

STANLEY  
RULE & LEVEL CO.  
New Britain, Conn.

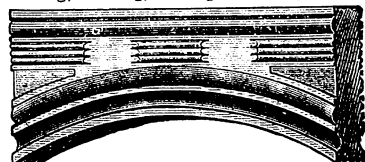
SOLD BY ALL  
Hardware Dealers.

Stanley's Universal Hand Bearer.



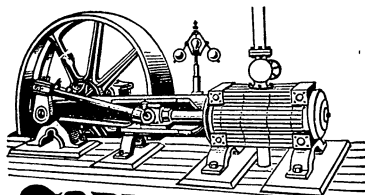
For Beading, Reeding, Fluting, or for light Routing.

SAMPLE  
OF  
WORK



DONE  
BY  
BEADER.

No. 66. Iron Stock, with seven Steel Cutters.....\$1 00



CORLISS ENGINES  
MACHINISTS  
IRON FOUNDERS, BOILER MAKERS.  
ROBT. WETHERILL & CO  
CHESTER, PA.

ALL SIZES  
1/8 in. to 4 in. diam.

I. P. RICHARDS  
PROVIDENCE,

R. I.

U. S.  
STANDARD  
PUNCHES

For Punching  
IRON AND STEEL

Star Non-Corrosive Steam Gages,

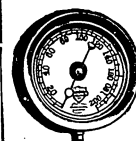
"POP" SAFETY VALVES,

Steam Engine and Boiler Apph-  
ances In General.

Highest grade only. Send for Cat-  
alogue and Steam Users' Manual.

Star Brass Mfg. Co.

37 Lancaster St., Boston, Mass.



THE ENGLISH AND AMERICAN  
MECHANIC:

An Every-day Hand-Book for the Workshop  
and the Factory.

CONTAINING

SEVERAL THOUSAND RECEIPTS, RULES AND TABLES IN-  
DISPENSABLE TO THE MECHANIC, THE ARTI-  
SAN AND THE MANUFACTURER.

By VAN CLEVE and EDWARDS.

500 Pages, Cloth, \$2.00.

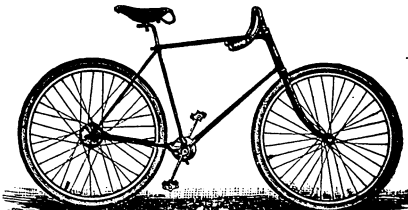
Sent, postpaid, upon receipt of price, by

DAVID WILLIAMS, 96-102 Reade St. N. Y.



## A SATISFIED CUSTOMER

is the best advertisement. This is the way they talk  
when asked how they like



THE LEAGUE CHAINLESS

after a 40-mile ride over hills and muddy roads: "If  
I was buying 50 bicycles 49 of them would be the  
League Chainless, and the 50th a chain machine  
for a relic!" This simply voices the opinions of  
thousands of others who have ridden the League  
Chainless. THE LEAGUE CYCLE CO., Hartford, Ct.

THE W. & E. T. FITCH CO.  
NEW HAVEN, CONN.  
MANUFACTURERS OF A VARIETY OF  
HARNESS SNAPS.



THIS CUT REPRESENTS THE  
CHAMPION HARNESS SNAPS.  
ALUMINUM STEEL SPRINGS. RUST-PROOF.

**PAUL S. REEVES,**  
Philadelphia.  
**Phosphor Bronze**  
AND  
**BABBITT METALS.**  
**Lead Lined Car Bearings a Specialty.**

Brass and Phosphor Bronze Castings from  $\frac{1}{4}$  pound to 20,000 pounds in weight.

**BUFFALO FORGES.**  
AMERICA'S BEST. **BUFFALO FORGE CO.**  
THE WORLD'S STANDARD. BUFFALO, N.Y. U.S.A.

**BUFFALO DRILLS.**  
FOR BLACKSMITH, CARRIAGE & WAGON MANFRS.  
24 SIZES. **BUFFALO FORGE CO.**  
BUFFALO, N.Y. U.S.A.

**STEEL TUBES**  
WELDLESS  
JOHN S. LENG'S SON & CO. NEW YORK

**Emery** Emery Wheels, Grinding Machines, Grinders' Supplies... Quick process and large stock.

WHEN IN A HURRY  
ORDER OF  
**The Tanite Co.,**  
New York, 161 Washington Street.  
Cincinnati, 1 West Pearl Street.  
London, Eng., Thos. Hamilton, 90 Cannon St., E. C.

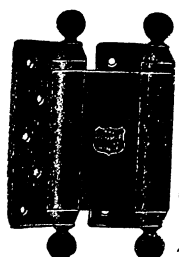
**MILLER & VAN WINKLE**  
**STEEL WIRE AND STEEL SPRINGS**  
TEMPERED COMPRESSION & EXTENSION SPRINGS  
A SPECIALTY  
OFFICE & WORKS 18 TO 24 BRIDGEST. BROOKLYN, N.Y.

**BICYCLE SPOKES**  
OF EVERY DESCRIPTION.

Tube Tapering Machines.

**EXCELSIOR NEEDLE CO.,**  
TORRINGTON, CONN.

**BOMMER** COMPOUND  
**SPRING HINGES**



**Are the Best.**  
Utility, Durability and Beauty Combined.  
**IT PAYS TO SELL THEM.**  
**BOMMER BROS.,**  
351 & 353 Jay St., Brooklyn, N.Y.

**STANLEY G. FLAGG & CO.,** Philadelphia, Pa.  
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.  
Manufacturers of **STEEL CASTINGS,**  
A Substitute for Steel and Wrought Forgings.  
Circulars Sent on Application.

**HOLIDAY GOODS.**  
**See Page 62.**

**MILLERS FALLS CO.,**  
93 Reade St., New York.

**EUREKA CAST STEEL COMPANY.**  
Office and Works, Chester, Pa.  
Open Hearth, Crucible and Eureka Steel Castings.  
Railroad and Machine Castings.  
Locomotive Cross-Heads and Gearing a Specialty.  
Guaranteed Knuckles for M. C. B. Couplers.

**SPRINGS AND AXLES**  
ROLLING MILL  
**F. W. WURSTER & CO.**  
375 Kent Ave. Brooklyn N.Y.

New Full Mounted  
Lightning Screw  
Plate.  
Send for Catalogue



**WILEY & RUSSELL MFG. CO.,** - Greenfield, Mass.

**LIDGERWOOD**  
**HOISTING ENGINES.**  
300 styles and sizes. Over 10,000 in use.  
**LIDGERWOOD MFG. CO.,** 96 Liberty St., N. Y.

ESTABLISHED  
Spring Making, 1842. Steel Making, 1845.  
Norway Iron, 1871 (Re-Rolled).

**WM. & HARVEY ROWLAND,**  
MANUFACTURERS OF  
**Springs, Steel, Re-Rolled Norway**  
**Iron & Slit Norway Nail Rods.**  
address FRANKFORD P. O., PHILADELPHIA.



**A. G. PECK & CO.**  
Cohoes, N. Y.  
MANUFACTURERS OF  
**AXES, ADZES,**  
**BROAD AXES,**  
**HATCHETS.**

Send for Catalogue and Price List.

**NOTICE TO MFRS.**  
If you wish anything in  
**BRITANNIA OR WHITE**  
**METAL TURNED,**  
Send sample per mail for estimate to  
**JOHN SOMMER'S SON,**  
355-365 Central Ave., Newark, N. J.

**RUSSELL, BURDSALL & WARD,**  
Portchester, N. Y.,  
Manufacturers of  
Carriage, Tire, Plow and Stove  
**BOLTS**

Carriage Bolts made from Best Square Iron a Specialty.

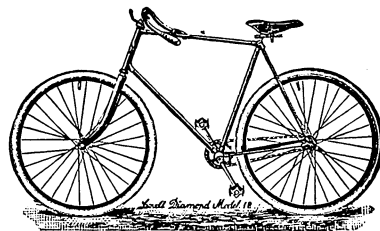


**More Artistic**  
than cast iron; better; stronger.  
**BRADLEY STEEL SHELF BRACKET.**  
Sells at a lower price. Pays a larger profit. Send for circular.

**Atlas Mfg. Co.,**  
New Haven, Ct.

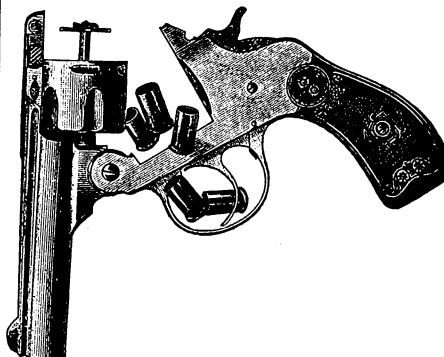
PAT. NOV. 8, 1882.

**WANTED**  
Wide-awake agents to sell the most popular, largest seller and best **BICYCLE** made,  
**THE LOVELL DIAMOND.**



Liberal terms. Send for Catalogue and Prices.

**LATEST AND BEST,**  
**JOHNSON**  
**AUTOMATIC REVOLVER.**



Send for our new catalogue of specialties.  
**JOHN P. LOVELL ARMS CO.,**  
Manufacturers and Jobbers in  
**Fire Arms, Bicycles and Sporting Goods,**  
**BOSTON, MASS.**

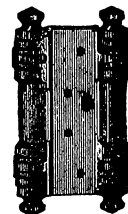
**GEM**  
**SPRING**  
**HINGES**

For Doors,		JAPANNED.			
Feet.	Inch.	Length of Flanges.	Single Acting.	Double Acting.	
6x2	$\frac{3}{4}$ to $1\frac{1}{8}$	3 $\frac{1}{2}$ in	63	83	
7x2	1 to $1\frac{3}{8}$	4 in	64	84	
7x2 $\frac{1}{2}$	1 to $1\frac{3}{8}$	5 in	65	85	
7x2 $\frac{1}{2}$	1 to $1\frac{3}{8}$	6 in	66	86	
8x2 $\frac{1}{2}$	$1\frac{1}{4}$ to $1\frac{7}{8}$	7 in	67	87	
8x3	$1\frac{1}{2}$ to $2\frac{1}{4}$	8 in	68	88	
9x3	$1\frac{3}{4}$ to $2\frac{1}{2}$	10 in	69	89	

For SCREEN, MEDIUM AND HEAVY DOORS.

**Single and Double Acting.**

THE  $\frac{3}{4}$  AND 4 INCH  
ARE THE BEST IN  
THE MARKET FOR  
SCREEN DOORS.



Send for full Catalogue of Bronzed, Brass and Bronze Metal Spring Hinges.

MANUFACTURED BY

**Van Wagoner & Williams Hardware Co.,**  
CLEVELAND, O., and 14 WARREN ST., N. Y.

# THE IRON AGE

THURSDAY, NOVEMBER 8, 1894.

## A Fifteenth Century Gun.

In these days of modern ordnance it is always an interesting sight to come across specimens of guns of the style in vogue 400 or 500 years ago. What we call modern high power guns to-day have to look back two or three centuries for their prototypes as far as their built-up feature is concerned, for one finds both at Ghent, in Belgium, and at Edinburgh Castle a type of gun that may well be called the great great grandparent of the present system. The production of to day in gunnery as in other walks of life is rather more rapid than his ancestor, and in many features bears but little resemblance to the parent tree. Breech loading has almost entirely supplanted muzzle loaders, although we occasionally find guns of unknown age having a rude attempt at

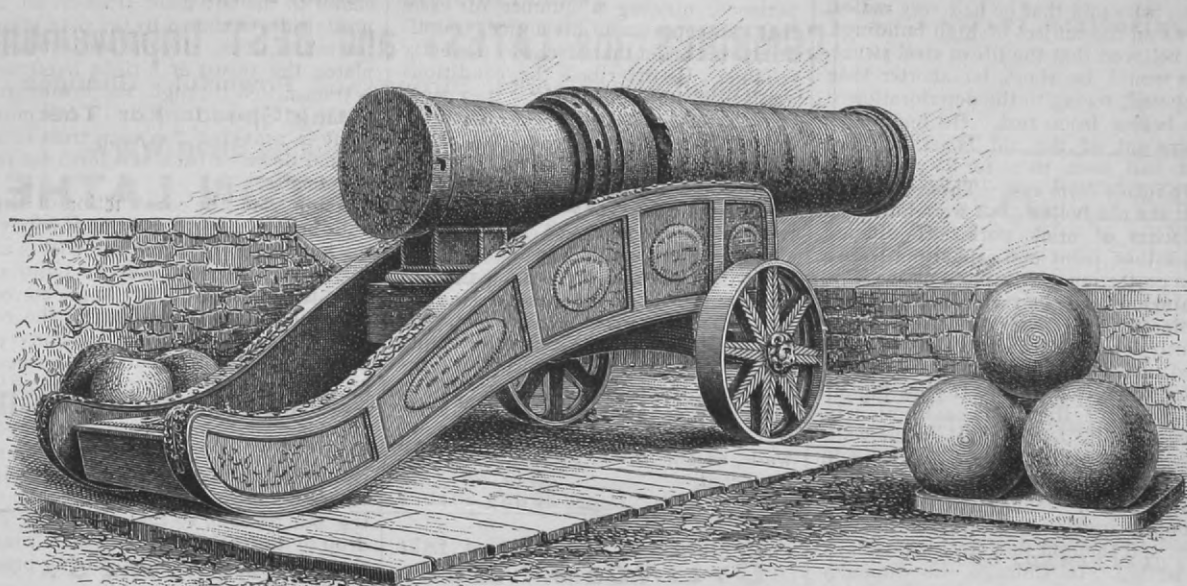
Simon de Lalaing after a memorable siege in which the gun played a very prominent part.

It is composed of welded grooved plates which form the body or tube of the gun. Over these are placed about 60 massive hammered iron hoops to bind the whole together. The length of the gun is 15 feet 9 inches, and its muzzle diameter is 34½ inches, the caliber being about 2 feet. The arms of Philip the Good are also to be seen near the breech end of the piece. Immense stone balls were the usual projectiles fired, although occasionally other material was used. The charge of powder was very much smaller in proportion to the projectile than we used when we gave up our smooth bores, and consequently the muzzle velocity was not great, but that it was sufficient for the purposes intended was well proven whenever the gun was brought to bear. So much

up system and is composed of long iron bars held together by iron hoops. It is 13 feet long and 20 inches in diameter. It weighs upward of 5 tons, and in the days of its activity one of the features of campaigns in which it was entered was its transportation from place to place, and many an interesting story is told of the breakdowns and makeshifts necessary to get it to the front in time to play its part.

## Storage Battery Locomotive.

Norton Bros. of Maywood, Ill., are using in their tin plate factory an electric locomotive deriving its propelling power from a storage battery. The locomotive displaces hand labor in pulling small cars loaded with tin plate from one part of the factory to another. The plant consists of a number of de-



"MONS MEG," A FIFTEENTH CENTURY GUN.

breech loading, and I think at the Naval Academy there is a murdering piece of bronze that was used by Cortez in Mexico that had a breech loading arrangement. But the imperfect loading and accidents due to escaping gas and blowing out of breech blocks induced the change back to muzzle loaders, and we find them casting guns of this type in Belgium before the fifteenth century, and also at the same foundry making the various parts for use with the built up guns.

A number of these guns were shipped to various parts of the world where places were being besieged and from their size and the battering down powers they possessed were considered marvels of efficiency. The famous gun of Belgium was named Mad Meg. In those days, and even as late as our civil war, it was the custom to name guns of unusual caliber or that had borne a prominent part in action. Mad Meg was cast in the early part of the fifteenth century and among other services may be mentioned the siege of Audenarde in 1452. The place was besieged by the citizens of Ghent, who were repulsed by

were these huge pieces dreaded that one is reminded of the coon story in which the animal beseeches the huntsman not to shoot, "I'll come down."

Mons Meg is the name of the other famous piece of ordnance, and this was also built up in Belgium. It forms a prominent object on top of the King's Bastion at Edinburgh Castle. It belongs to the Meg family and gets its Christian name from the fact of its having been made at the town of Mons in 1476. From this we can see that it is some years younger than Mad Meg, and is considered as being an improvement.

It was in prominent service in 1489, when James the Fourth used it at the siege of Dumbarton, and about a dozen or so years later it was blazing away at the siege of Norham Castle, on the Borders. Some hundred years afterward, in 1682, it burst when a salute was being fired in honor of the Duke of York. In 1754 it was removed to the Tower of London, where it remained until 1829. Sir Walter Scott interested himself in the gun and had it removed to Scotland, where it now remains.

Mons Meg is also made on the built-

tached buildings, and the magnitude of the operations compelled the adoption of some sort of mechanical power in transferring the heavy material between the several departments. A storage battery locomotive was decided to be the best adapted to the peculiar requirements of the work, and the firm of Pierce & Richardson, Manhattan Building, Chicago, prepared the design and supervised the installation, the battery being the work of Frederick L. Merrill. It is stated that the locomotive has worked so satisfactorily that Norton Bros. contemplate the addition of others.

The locomotive is built of wood, but strongly constructed. It is 5 feet in length, 80 inches in width and 44 inches in height. Its weight is about 5000 pounds, and its four wheels are 20 inches in height. The battery consists of 24 chloride cells, and is placed in the upper portion of the locomotive under cover. The motor is mounted on a McGuire truck, and develops 4 horse-power at 50 volts but is capable of running up to 6 horse-power at 80 volts. The locomotive has pulled five



cars weighing over 8000 pounds on a track not in the best condition. The cells of the battery have been found to endure jarring or bumping satisfactorily. The battery is charged on the premises from a generator which is also used for supplying power to motors running machines in various portions of the plant. A wire is run from the generator to a number of points along the track, at which the battery can be charged whenever the locomotive is standing, thus keeping its efficiency constant.

### Steel in High Buildings.

During the recent annual convention of the American Institute of Architects, a discussion was had on the use of steel in high structures. It was brought out by the reading of a paper by T. M. Clark, entitled "Protection Against Fire; the Architect's Attitude and Duty; Skeleton Construction in Its Relation to the Fire Department in Boston." The *Engineering Record* prints the following report:

The discussion was opened by Geo. B. Post, who said that he had very radical views on the subject of high buildings. He believed that the life of steel structures would be short, far shorter than supposed, owing to the deterioration of the beams from rust. He had taken beams out of the old *Times* Building that had been there for 35 years that were rotten from rust. These had been over the old boilers, but were buried in 8 inches of brick work. He did not think that paint and asphaltum were a sure protection. All plate beams were laminated, and the rust splitting off the laminations a fresh surface was constantly exposed. He admitted that steel rusted less than wrought iron, but more than cast iron. In putting up buildings of the cage construction he always built the cage inside (the walls being anchored to it), so that it could be readily inspected.

W. L. B. Jenney believed that wrought iron was as durable as cast iron, and thought that steel was equally as lasting. In Chicago the difficulty was, not to protect against fire—that they could do—but against the firemen. He cited the case of the Athletic Club fire, where the terra cotta walls were almost at a white heat when the streams of water were applied. He had found that wire lath covered with any good wall cement stood fire and water tests admirably. For external fire protection he thought porous terra cotta very good, providing the anchors were well covered. For internal protection of warehouses where inflammable goods are stored he suggested putting on a second lining of fire proofing.

C. H. Blackall suggested a plan for protecting externally by the use of a water curtain flowing over the walls.

Mr. Robinson thought the design of of high buildings was more of a utilitarian problem than an artistic one. He objected to cast iron, as engineers had found it impossible to devise any satisfactory scheme for inspecting it.

Mr. Post then said that he was able to get satisfactory cast iron columns and satisfactory tests. He believed in using it in part, together with steel. He did not think that the question of elevator space was a serious one now, since the electric elevators were coming into use, and a large saving of space for machinery was effected by their use, as they took not more than one third the space taken by hydraulic elevators.

Mr. Jenney again spoke strongly in favor of steel, and spoke of defects discovered in iron castings in his experience that would not have been developed by any of the usual tests.

Prof. W. H. Burr, on being invited to express his views, stated that he believed in looking at the question from the standpoint of an engineer. Engineers had had so much trouble to get reliable cast iron work that now they used it as little as possible. He cited his experience where apparently reliable castings had given way and sometimes exploded before any load had been applied, owing to the internal strains. Cast iron was all right for pedestal blocks and where used in heavy masses. He was surprised that architects were so willing to use it. While the general impression was that cast iron resists corrosion better than wrought iron, he thought that there was really little difference. Under adverse conditions there was no doubt that wrought iron and steel often corrode very rapidly, but when properly painted and under ordinary conditions this never occurred. He had never seen laminations split off. Structural steel was not laminar.

President Burnham then gave his experience, quoting a number of cases that had come under his notice, and affirmed his belief that steel was perfectly reliable. He described the conditions existing in Chicago, and how they came to use steel footings there. The only danger, he thought, lay in the joints and at the faces of the beams.

In concluding the discussion Mr. Post said that he did not criticize steel so much as he did much of the construction now going on in New York, where the work was put up with apparent recklessness in many cases. He had seen the rain from a northeast gale driven through a brick wall 4 feet thick and run down on the inside of the building. Beams exposed to such moisture would certainly rust very fast. He feared more for rear walls than front walls, as the former were never as well protected.

### Coal Storage at the Head of Lake Superior.

The Lehigh Valley Coal Company are building a coal dock at the head of Lake Superior that for modern methods of building and for automatic appliances is far different from anything that has yet been constructed, and is claimed to be so much better than anything else that it will compel the adoption of a like system elsewhere. Its claims of superiority are that the cost of screening and reloading coal into cars is reduced to 4 or 5 cents a ton, a very important item, and that the coal is stored in less space. It is designed to have two houses of steel for the storage of anthracite and a bituminous pile, the whole with a storage capacity for 130,000 tons of hard and 200,000 tons of soft coal. The work is done under the general plans of the Dodge Coal Storage Company of Nicetown, Philadelphia, and the steel construction is by the Allentown Rolling Mills of Pennsylvania. The anthracite coal will be stored in two great steel buildings of parabolic section, and each 246 feet in diameter. They will be 100 feet high to the top of the cupola, and the coal will be piled 80 feet deep in the center, and 17 feet at the edges. To hold the coal pressure against the sides of the buildings, where all the pressure will come, as the coal is piled in pyra-

midal form from this depth to the center of the house, a wall is built of 4-inch I-beams, spaced 3 feet apart, carrying No. 16 corrugated iron round the inside to a height of 17 feet. To anchor this wall against the tremendous pressure of the coal a continuous band 3 feet high is placed 20 feet inside the circumference of the building, some distance above the floor, and from each I-beam of the wall two rods run to this band. The first coal that is brought into the building comes to a point above this band, and is dropped upon it, the coal itself thus anchoring the band.

The buildings are novel in construction, from the fact that the roofs are held by 12 complete three-hinged arches which intersect at the center. In order to secure a three-hinged arch and thus avoid ambiguity of stresses, it was found necessary to bring the arches into four distinct groups, and by varying the detail of the upper ends or necks, bring the pins of the groups to four different levels. As it was impossible to cross the three arches making up a group, the center arch of each group is carried across in the usual way, while the right hand truss is connected by a pin at the center to the left hand truss on the opposite side, as shown by the plan giving the center lines. By the use of bearing plates the thrust of a right hand truss is transmitted through the center truss to the left hand truss, and a free movement is provided for each truss either up and down or back and forth for several inches.

Aside from the construction of these buildings, which is new, it is believed the method of handling the coal is also new. It is carried into the buildings from the dock front by Bogle conveyors 120 feet high, which lift the coal from the hold of a vessel and convey it back and down to a point in the house 20 feet inside the circumference and 25 feet above the ground. Here it falls on the floor, and when the pile reaches the height of 25 feet it is conveyed on a ribbon in an inclined trough to points where it can be dropped on the ever rising pile of coal, so that after the first drop of the coal it does not fall more than a few inches, thus reducing breakage to a minimum.

After the house is filled it is emptied as automatically as possible. From the center of either building toward a common point on the dock front runs a circular cast iron tunnel, 7 feet in diameter, and sunk below the floor of the house. In each are two endless chains carrying conveyor scrapers, onto the upper side of which discharge steel pipes 15 to 18 inches in diameter and 12 feet apart. These lead from the floor of the house, and it is intended that when opened by pulling a door, the coal shall flow down through them to the endless conveyor, and be carried out and to the top of a small building in which are sets of automatic screens, where the coal is screened and loaded into cars for shipment. To bring the coal, as the quantity in the storage houses diminishes, to the openings in the floor, there are five reloading tracks in concentric circles, on which will travel a Dodge pivotal reloader, provided with chains and flights, which pushes the coal into the holes in the floor. It is expected that the work of loading and screening will be done by half a dozen men outside the machinery force, and that 60 or 70 will be displaced. The buildings will cost not far from \$500,000, and it is hoped to get a little coal into one of them this fall.



### Hydraulic Boiler Plate Bending Machine.

*Engineering*, from which we take the following, states that the machine here illustrated has been designed to overcome the difficulties hitherto experienced in bending to a true circle throughout the heavy plates now used in marine boiler work. When such plates are bent in rolls, the cost of machines sufficiently powerful to deal with plates, say,  $1\frac{1}{2}$  inches in thick-

7 to 12 feet wide by  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches thick. This difficulty was twofold—one to manage the straight long length before the plate was entered, and still more so when, having passed through the dies, it was curved to the radius of the boiler, and 25 to 30 feet of curved plate was in the air. All these difficulties were overcome, at the suggestion of R. H. Tweddell, by placing the girders vertically, as shown in our illustration, and the adoption of the parallel motion for working the moving girder,

perfectly square with it; therefore the boiler plate placed on edge thereon must enter squarely between the dies. Again, as soon as the shop crane has placed the plate in position it is traveled forward by a man and a boy, who press small pinch bars—the ends of which enter small holes cast in the floor plates—against small bars put into the tack holes already in the plate, and thus push it forward. In order to render this work easier, small hardened steel bars or runners about  $\frac{1}{2}$  inch in diameter are placed under the plate, and these run between it and the floor. Thus, after once the plate has entered, the shop traveler is free until required to take the finished plate away.

The machine itself consists of two vertical fixed girders united by a bottom bed plate, and also a top girder. In our illustration it will be seen that a portion of this top girder is moved upward out of its seat. Of course when the plates are being bent this bolt is secured to the outer girder, the object of its being removable being to allow plates bent to a small diameter to be drawn up over the front girder when finished.

The inner edge of the outermost girder, as will be seen by the sectional plan, Fig. 2, is convex, while the opposite edge of the moving girder is concave. Hence when the moving girder approaches the other, it bends the plate to a corresponding radius. It has been found in practice that it is not necessary that the dies should meet, having the plate accurately fitting the space between them; it is only necessary that the dies bear on three points, and, by means of a suitable regulating gear, the

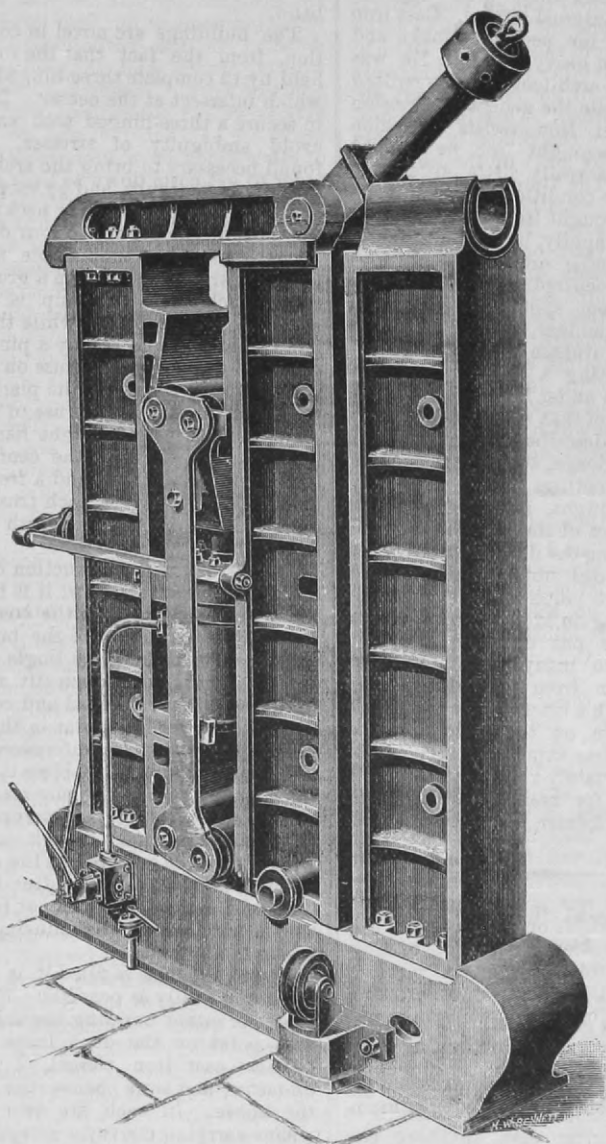


Fig. 1.—Perspective

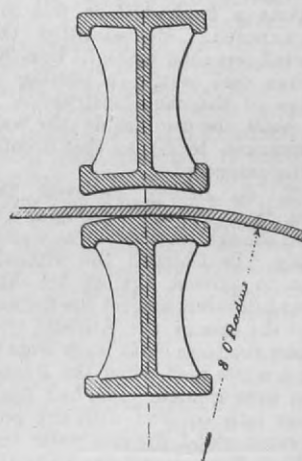


Fig. 2.—Sectional Plan of Bending Surfaces.

### HYDRAULIC BOILER PLATE BENDING MACHINE.

ness, is very great, and the risk of their fracture by overfeeding is very considerable. But apart from this is the difficulty in bending the plate to a true curve at the end which leaves the rolls last.

There is, of course, nothing new in bending plates to a circular form in hydraulic presses, and so far as boiler shell plates are concerned, this was, we believe, first done by Messrs. Elsingham of South Shields, the well-known boiler makers. They, however, passed the plates through a press on which the dies were placed horizontally, and considerable difficulty was therefore found, not only in insuring the fair entering of the plates, but still more in handling plates 25 to 30 feet in length and from

which, as is well known, is so successfully used in their multiple punching and plate shearing machines by Fielding & Platt of Gloucester, who are copatentees with Mr. Tweddell in these inventions and also in the boiler shell bender here illustrated. By the use of this frictionless gear another trouble hitherto experienced in presses which, from their length, require two or more hydraulic rams, was overcome. The difficulty in getting two or more rams on one long girder to travel at the same speed is well known; and this also tended to make untrue work.

By placing the machine vertically, all trouble in entering the plate fairly ceased. The machine is placed on a level flooring of cast iron plates and

exact distance traveled by the moving die, to secure a uniform curvature throughout the plate, is maintained constant during the whole operation. The importance, therefore, of the moving die being always parallel to the outer one is obvious, and this end is secured by means of the parallel motion employed.

The hydraulic cylinder is fixed to the back girder. To the top of the ram is attached a cross head carrying two rollers. By means of two side rods a similar set of rollers are raised simultaneously with the top ones. Two straight facing pieces are on the moving girder, while on the back standard are two inclined planes. The rollers—which, by the way, are in rolling con-

tact with each other and the above bearing surfaces—being pushed up by the rams, force the moving girder forward and press the plate. The return motion is effected by the weight of parts, assisted by a hydraulic cylinder on the back girder. The working valve is shown on the bottom casting, on which also are placed, on either side, the swiveling rollers on which the plate partly travels.

These machines have been made to take in and bend cold steel plates  $1\frac{1}{2}$  inches thick by 13 feet wide. The length of the plate, of course, is unlimited, except by the difficulties of manufacture.

The German Government, which, perhaps, just now takes the lead in adopting any machinery tending to improve the quality and reduce cost of work, has three of these machines, all of the largest size, and Blohm & Voss had one of the first in their works at Hamburg. In England the most successful application is probably that at Messrs. Doxford's boiler yard, at Pallion. Much assistance was afforded to the makers by this firm, who took great interest in seeing that the machine was given all the advantages due to careful consideration in arranging for taking the plates to and from it, and in manipulating them on suitable floor plates. It may be here mentioned that, the machine being self contained, practically no foundations are required.

So far as speed of working is concerned, the largest and thickest steel plates in use can be bent to their final curvature at the rate of from 2 feet to  $2\frac{1}{2}$  feet per minute, and in this machine the plate is only passed through the dies once, and there is no risk of fracture by feeding too quickly. It is a very valuable addition to a boiler yard plant, not only for the heavy class of work to which we have alluded, but also for smaller boilers and their plates. It occupies little space; in fact, at Messrs. Doxford's it stands between the wall columns of their shop, and, unless pointed out, would hardly be noticed. The amount of water used is very small, and as all boiler shops have now hydraulic pressure available, there is no additional outlay necessary on pumps and accumulator. In these benders, the latest addition to the large number of machine tools manufactured by them on the Tweddell system, Fielding & Platt have achieved an undoubted success, and their workmanship and design leave nothing to be desired.

**Mesaba Royalties.**—An effort is to be made by the iron men of the Mesaba range this winter to secure a reduction in the State royalties on ore mined on lands belonging to the State. Already plans have been made under which the members of the new legislature are to be taken over the range and shown the need of reductions. While there is no doubt that the men who are paying State royalties are suffering, there is not much prospect that these royalties can be lessened while the rail rates to the lake are held at their present figure and the original lessees of such mines as the Oliver are getting from 25 to 40 cents above the State royalty of 25 cents. The Oliver is the mine on which the argument on both sides is made, for it is operated by the sub-lessees under a second lease from the State through the Rockefeller Company, the claim being made that they are losing money. The mining men claim that this is proof that royalties are too high, while the other side expect to prove when they get to talking that the assertion that the mine

is losing money is proof that the exorbitant rail rate of 80 cents a ton to Duluth and the sub-royalty of 40 cents, this season cut to 25 cents, should both be cut to a reasonable basis. The mining men will ask a sliding scale of royalty, based on 15 cents at the present price of ore and rising to 25 cents when ore touches something like \$3 at Cleveland. The great profits of the Rockefeller road—the Duluth, Missabe & Northern—arise and will continue to do so from the ore carrying contracts they have with mining companies like the Oliver, the Biwabik, the Franklin and others. The contract price of ore hauling is 80 cents a ton from the mines to Duluth, "providing no other road shall haul ore from any part of the range to any ore port at a less price." Therein lies a possible solution of the difficulty that has not been seen by many of the iron men of the range. The Duluth & Iron Range Road have, practically speaking, no ore hauling contracts. They are busy and will be so for years on ore that belongs to the Minnesota Iron Company, of which they are a sub-concern. It makes no difference to the Minnesota whether they charge 25 cents or \$1 a ton for ore hauling, as whatever profit there is either in mining or shipping goes to the same pocket. The possible result, and that which long headed mining men are even now figuring on, is very plain.

#### Chief Melville's Opinion of the "Columbia" and "Minneapolis."

Geo. W. Melville, in the report of the Bureau of Steam Engineering just issued, makes the following remarks concerning the "Columbia" and "Minneapolis":

While all of these vessels made very successful trials, the greatest interest centered in the "Columbia" and "Minneapolis," from the fact that they were the first ships of any country propelled by triple screws in which a requirement of more than 20 knots an hour was stipulated, and from the fact that the maximum power for which they were designed was greater than that of any war ship afloat or projected at the time, and greater than that of any transatlantic steamer then in service. The fitting of triple screws in these two vessels was brought about by the peculiar conditions of the design of the ship—to be of moderate dimensions, with large coal capacity and exceptional power in order to reach a maximum speed of 22 knots.

At the time the design was made there was nothing of an experimental character, except on a very small scale, to indicate the relative efficiency of propulsion by two or three screws, but the generally recognized opinion was that three screws would be less efficient than two; and working on this theory greater power was given these ships than was found to be necessary for the designed speed, with the result that the "Columbia" and the "Minneapolis" stand unrivaled and unapproached in point of speed by any naval vessel afloat, except those of the torpedo boat class. Although the design was looked upon by many as too big an experiment to make, the success of it has fully vindicated the judgment of the bureau, and paved the way to greater speed in transatlantic steamers; for I am convinced that if the ideal five-day steamer becomes a reality she will be one with triple screws, and that it is in this direction we must proceed if we expect to make an increase in the speed of large cruisers.

## Indiana Industries.—I.

A representative of *The Iron Age* recently had occasion to visit the natural gas district of Indiana, and while there called upon a number of manufacturing establishments. Although this is regarded as a highly favored region, owing to the abundant supply of nature's choicest fuel, yet it was found that the general depression in business is quite seriously felt even here. Manufacturers complain of ruinous prices, notwithstanding their free fuel, and the restricted demand for their products is reflected in the curtailment of their working forces and the reduction in hours of work. Wages have been cut here as well as in localities where high prices are paid for fuel and economies of other kinds have been instituted in order to get costs down to their equivalent at other points. And yet, in comparison with some manufacturing localities recently visited, there was a general appearance of activity throughout the region with indications that ere long full employment would be found for workmen now idle. The glass industry is gradually working into better shape so far as mere operating is concerned. Plate glass factories, long idle, have started their fires again. The larger towns in the gas belt are making municipal improvements, paving streets, building sewers and enforcing regulations generally that will add much to the appearance of the towns as well as contribute largely to the health and convenience of citizens and visitors.

#### The Future of the District.

Any one who will take the trouble to consider the geographical situation of this district cannot fail to be impressed by the fact that it is centrally located with respect to numerous great markets. The manufacturers of Indiana might be considered as too far west to catch much of the trade of the East, with so many competitors in the intervening territory, but nevertheless they enjoy a fair share of Eastern business. They are within easy reach of the large cities on Lake Erie, and close to Chicago and the Mississippi River cities, while they are specially well favored in their proximity to Louisville, one of the great gateways to the South and its growing trade. Numerous railroads traverse this section, several of the leading trunk lines of the country having built through it long before natural gas was regarded as a practicable fuel. Local roads and feeders of the trunk lines supply almost every nook and corner of the district with transportation facilities.

The utmost care has been taken to husband the gas supply. The extravagance of other gas districts and the rapid exhaustion of the supply have been a warning to Indiana manufacturers, and they are heedful of the lesson. No indications are at present perceptible of a diminution in the supply of gas, and it is expected to hold out for years to come. If it should be exhausted, abundant supplies of high grade coal are near at hand, as well as a great oil field, which has thus far merely been exploited to determine its extent, but has not been seriously drawn upon. Manufacturers and business men are therefore confident that they will be able to permanently maintain any vantage gained through the powerful impetus of free gaseous fuel.

#### Inducements to Manufacturers.

One might suppose that by this time the peculiar advantages of the district

would be relied upon for industrial growth. But inducements are still being offered to manufacturers to locate in this territory. Anderson has done a great deal in this line of late, a cash bonus being paid in addition to a free site and free natural gas. Other towns have also secured important factories, whose owners deem it desirable to obtain greater advantages in manufacturing cost in order to meet the low selling prices now ruling. Marion has been worsted in endeavoring to influence some of these new comers to locate there, because the town was without a fund from which to pay a cash bonus, and the citizens are now raising \$50,000 as a starter. They expect with this amount to be able to enter the race and accomplish important results in further building up their manufacturing industries and increasing their working population. The wisdom of this method of forcing the growth of towns has been often and severely criticised, but it nevertheless goes on and will be continued. It has undoubtedly worked well when managed by prudent business men who exercised scrupulous care in selecting the recipients of their favors. With all the natural advantages offered in this district, it would by no means have attained anything like its present importance in manufactures if additional inducements had not been offered.

#### Tin Plate Works.

In writing of the natural gas district of Indiana the subject of tin plate works comes in the foreground, as so much progress has been made there in this line and further developments are to be expected in the near future.

The American Tin Plate Company, at Elwood, have the largest plant. Their works have been very successful, and until the controversy over wages came up they were run to their utmost capacity. The product of this establishment has thus far been made wholly on orders for special sizes to meet the requirements of large consumers. This class of trade was preferred to the manufacture of standard sizes for jobbers. A new mill, superb in all its appointments, has just been built, but not yet put in operation. It is unusually heavy, to diminish the chance of breakages, and is expected to do fine work, but it will not be started until the wages question is settled. The company will then have ten hot mills, together with the necessary cold mills, shears, doublers, picklers and tinning pots to handle the entire output. At present only two mills are in operation, and these are run merely to supply a few customers who depend solely upon the Elwood Works for their supply of tin plates. It is the opinion of President W. B. Leeds of this company that the manufacture of tin plates should be conducted separately from the manufacture of merchant sheets in order to attain success. The discipline of a tin plate factory is necessarily much more rigid than that of a sheet mill. Every stage of the operation must be most carefully conducted in order to secure high quality in the finished tin plate, and quality must be the objective point to insure commercial success. The Elwood plates under his watchful care have already attained a high reputation.

The Morewood Company's plant, at Gas City, is next in importance. They have six hot mills, with foundations laid for two more mills which are shortly to be added. This plant is also run largely on orders for special sizes

of tin plate. Thus far over 50 different sizes have been made. This would appear remarkable if the fact was not known that Morewood & Co., in Wales, have considerably over 300 sizes passing through their books. The Gas City Works make three kinds of terne plate in addition to tin plate. One of these is hand dipped, having a very heavy coating, another is finished with a mottled surface by the company's own process, and the third has a plain surface. The most rigorous methods are pursued in these works to secure the highest quality possible, thorough inspection following every step in the progress of the steel through the works. As an instance of the economy practiced in these works the fact may be mentioned that the dross from the tinning pots is collected and smelted in a special furnace, by which all the metal is saved except an almost infinitesimal part. This plant was in full operation under an agreement with the workmen to take whatever wages might be agreed upon at other mills.

The Irondale Steel & Iron Company's plant, at Middletown, is the third fully equipped mill in the field. Up to the past week this mill has been running on black plates only, under a contract taken some time since. Two hot mill were in use. Four more mills are now being added, together with the necessary auxiliaries, and they will probably be ready for operation during the coming month. The tinning house is completed and some of the pots are in place, which are probably turning out tin plate by this time. This plant has been very substantially constructed, the mill building being of steel covered with corrugated roofing and siding, while the tinning house is built of brick and iron, the entire works thus being fire proof. The plant is well arranged, all material constantly passing forward until it reaches the shipping department. It is located on the Richmond division of the Panhandle Railroad, from which tracks run into the mill. The company have carefully guarded their interests in the matter of fuel by leasing gas rights in the surrounding territory for a long distance.

New black plate mills and tinning plants are in course of erection at Atlanta, Montpelier and Anderson, but it will be several months before any of these are ready to roll. A new plant is talked of at Elwood, and one is mentioned in connection with Alexandria.

The tin plate industry has called into existence also a class of manufacturers to furnish tinning machinery. The Elwood Iron Works at Elwood, Ford & Donnelly at Kokomo, and the Anderson Foundry & Machine Company at Anderson are all engaged in the business of making tinning pots and rolls, pickling machines, annealing boxes, floor plates, &c. All of them seem to have considerable business of this character.

#### Marion Industries.

The Westernman Natural Gas Iron Company are operating at Marion what they term "the smallest mill with the biggest capacity" in the country. This mill, with two small trains of rolls, has made per annum over 11,000 tons of iron of small sizes. The success of the concern forms a conspicuous example of the result accomplished by adhering to a special class of trade. The company manufacture iron suitable for rivets, bolts, coach screws, carriage work, &c. They have not shut down at any time during the depression for lack of work, but have been able to run steadily to their full capacity, and are now crowded

with orders. While this is their normal condition, they have not been tempted to expand their capacity in order to capture still more business, and consequently every part of the works receives the same watchful care as when they were first started, and the reputation of the product keeps up. This mill works no steel, but runs on iron exclusively.

The Marion Steel & Iron Company celebrated their first anniversary October 23. They began to build their rolling mill in April, 1893, so that the work of construction extended through the panic. Nevertheless, they pushed on and successfully weathered the storm. Although they started at such an inauspicious time, they were able to secure a fair share of business. They have a 10-inch train of rolls and are running at considerably more than half capacity, making bar iron and ovals, and heavy bands and hoops down to No. 16. The president of this company is C. A. Bortz, late of the Maumee mill, at Toledo; W. C. Ely is secretary and treasurer, and Thomas Reed is mill manager.

The Columbia Zinc Works, of which James Latourette is proprietor, are in full operation manufacturing spelter for the general trade, and turning out about three carloads per week, which is principally shipped to consumers east of Marion. The ore is brought from Missouri. Silicate ore has been used hitherto, but an additional furnace has just been completed which will run on jack ore or blende. The new furnace consists of 16 kilns, arranged with eight on each side, and provided with three stacks, of which one is in the center and the others are at the ends. The furnace is 60 feet long, 18 feet high and 12 feet wide, and is expected to add considerably to the output of the works. The product is sold almost entirely for galvanizing purposes.

The Sweet & Clark Mfg. Company have received some benefit from the recent partial revival of activity among the car builders, which enabled them to start up their malleable foundry. Although work of this character has been intermittent, they are now hoping to be able soon to run full handed and on full time. The currycomb department will also be put in operation, the output being disposed of through the American Currycomb Company.

The Marion Stove Company have had a fair year and are now very busy. They make a specialty of the Retort stove, which is a magazine heater for burning any kind of soft coal. The managers of this company have been very successful in pushing their specialty, on account of the thorough manner in which they handle the trade. Analyses of all the leading kinds of soft coal in the country have been carefully and systematically gathered, and the user of one of their stoves is advised how to regulate it so as to burn to best advantage the coal of his locality. The stove, when properly managed, burns soft coal and keeps fire as well as a base burner operates with anthracite. The trade of this company not only covers the soft coal districts of the West and South, but also extends into the soft coal section of Pennsylvania.

The Bruce & Marks Mfg. Company, at Gas City, near Marion, are running but a small force at present, but will shortly employ their usual number of hands in the manufacture of sickles or grass hooks, hay knives and corn knives. They make several varieties of corn knives, but the grass hooks are of the Marks patent design, with double



back, perfectly balanced and the weight equalized on each side of the shank to prevent the usual tendency of the point to drop. The company's facilities for manufacturing are excellent, including heavy power hammers for forging the blades from bar steel.

The Indiana Rubber & Insulated Wire Company of Marion have a large brick factory at Jonesborough, in which a variety of rubber products are made, including pneumatic tires for bicycles.

#### The Kelly Axe Mfg. Company.

At Alexandria, midway between Marion and Anderson, are situated the new works of the Kelly Axe Mfg. Company, formerly of Louisville, Ky. It is the largest plant in the business of manufacturing axes and the only one having free fuel. The company draw their supply of gas from their own well, and also control a good deal of gas producing territory, so that they feel assured as to the future. They make nothing but axes, believing that special attention to one class of goods will produce far better results than a division of interests. The factory at Alexandria is the fourth built by this company. Their first soon proved too small, their second was burned, and the third was abandoned on the transfer of the business to Alexandria. The new factory embodies all the improvements suggested by their long experience in manufacturing. The buildings are substantial brick structures and are placed in the center of a large plat of ground, being laid out with a view to the enlargement of any department. Extensions can thus be made without interfering with manufacturing operations, or compelling perhaps expensive alterations in the original plan. The new factory was first put in operation on July 4, but all the machinery had not then been installed. Additions are, in fact, still in progress, and the working force is being steadily augmented. It is expected that 500 men will be employed when everything now under way is completed. Wages have so far not been reduced by this company. They enjoy a good export trade, and in this connection a notable shipment was made on October 24. A carload of axes was then shipped to New York of which one-fourth was destined to South Africa, one-fourth to Australia, one-fourth to Mexico and one-fourth to Alaska.

At Alexandria are located the great plate glass works of the De Pauw Plate Glass Company, which have just been started up after a long term of idleness. An interesting point in connection with these works is the introduction of the Pittsburgh Crushed Steel Company's crushed steel for grinding plate glass, to take the place of sand. Two pounds of crushed steel costing 30 cents are stated to be equivalent in efficiency to 4 tons of sand costing \$3.20, and the uninjured steel is caught for use afterward, while the sand is worthless. The new abrasive is reported to give perfectly satisfactory results in other respects.

A melancholy sight on the southern outskirts of the same town is the partly built plant of the New Albany Rail Mill Company. The foundations had been partly laid, several heating furnaces built and a portion of the machinery removed from New Albany when the De Pauw failure interrupted the work. Grass and weeds have hidden the foundations, the furnaces are almost in ruins and the machinery is weather-beaten, but the location appears to have been well selected, and the Alexan-

drians have hopes that the company will be reorganized and the works built according to the original plans, which are understood to have contemplated sheet mills.

#### Tin Plate Makers' Wages.

On Monday, October 29, the United States Iron & Tin Plate Mfg. Company, Demmler, Pa., issued a notice to their idle employees to the effect that operations would be resumed at once. After stating that the wages of common labor will not be reduced the notice continues: "The following reductions will be made on high priced labor, namely: Rollers on tin mill, 30 per cent.; doublers and heaters, 25 per cent. After these reductions, if the same weights are turned out as the average weights made during the last six months, men can still earn wages, a day of eight hours, as follows: Rolling, 30 gauge, 4700 pounds, at \$5.50 per ton, 2240 pounds, \$11.12; less 30 per cent. (\$3.34), \$7.78; less catchers' wages (\$1.75) \$6.03; doubling, 30 gauge, 4700 pounds, at \$2.70, \$5.66; less 25 per cent. (\$1.42), \$4.24; heating, 30 gauge, 4700 pounds, at \$2.48, \$5.17; less 25 per cent. (\$1.29), \$3.88. It is our desire to retain all our old employees, but we shall engage new ones in place of those who are not satisfied with this action." The action of this firm in notifying their employees to resume work or forfeit their positions can be considered as the opening of hostilities between the Amalgamated Association and the Tinned Plate Manufacturers' Association of the United States. It will be remembered that in September a conference was held in Pittsburgh between the above two organizations at which the manufacturers proposed a reduction of 30 per cent. in wages of rollers, 25 per cent. to heaters and about 20 per cent. to other tin house labor. The reason advanced for these reductions in labor was the reduction in the duty on tin plate of 1 cent per pound, or \$20 per ton, which went into effect on October 1, 1894. The Amalgamated Association submitted the matter of the proposed reduction to their members and a vote was taken on it, resulting almost unanimously against accepting the reduction. No counter proposition was made by the workmen, and a shut down of the mills took place, only five or six concerns continuing in operation, these being principally located in the natural gas belt in Indiana. In this connection it should be noted that the tin plate concerns who continued in operation were given to understand by the Amalgamated Association that they would be allowed the benefit of any concessions that might be given to the other manufacturers.

Last week Wallace, Banfield & Co., Limited, of Pittsburgh, posted notices in their Irondale Rolling Mills, at Irondale, Ohio, a copy of which is as follows:

"Owing to a decline of 1 cent per pound in the selling price of tin plate caused by a reduction of 1 cent per pound, \$20 per ton, in the new tariff duty, which took effect October 1, 1894, it is impossible to longer run the mills at former scale of wages. All persons are, therefore, hereby notified that all contracts, &c., will terminate Saturday, October 27, 1894. We invite all our present employees, on or before Tuesday, October 30, to apply to the manager, Mr. Banfield, who will notify them of what, if any, changes have been made in their wages, and

signify to him their intention to accept or refuse the same. The mill will start Monday, November 5, 1894."

The above two concerns are among the largest manufacturers of tin plate in this country, and their announcement that they propose to put their plants in operation at once, and without their old employees if necessary, will doubtless cause other concerns to take similar action in the near future. The outcome of the struggle between the tin plate makers and organized labor will be awaited with considerable interest. A report that a compromise would be agreed upon and a fight averted has been officially denied.

#### The Howell Torpedoes.

The Naval Bureau of Ordnance recently accepted another lot of Howell torpedoes built by the Hotchkiss Ordnance Company. The Government now has two distinct types of torpedoes, the Howell and the Whitehead, which have been approved by foreign countries. The principal difference between these two types is found in the motive power. The Whitehead employs compressed air, while the Howell depends upon a heavy steel fly wheel run at great speed by a steam turbine, and so arranged as to turn the propeller. This torpedo is of the familiar cigar shape common to the various similar weapons. In some respects its mechanism is simpler than that of the Whitehead. The latter contains six sections or compartments, while the Howell has four, all being distinct and detachable. First comes the nose, as it is called, which contains the firing pin and its connections. Behind it is the head, which carries the explosive charge of gun cotton and the detonator. The nose piece for the sake of safety is screwed on just before firing, and the firing pin is secured by an automatic attachment, but set free while the torpedo is rushing through the water. The diminution of the pressure at the limit of its range releases a spring and locks the firing pin again. The torpedo can be sunk to the bottom by admitting water, or, for experimental purposes, the admission of water can be prevented and the torpedo will rise to the surface.

But it is in the third chamber, where the heavy fly wheel is mounted with its screw gearing, that the most interesting feature is found. The axle projects through the shell on one side, and when the torpedo has been placed in the launching tube a steam motor attached to the latter clutches the fly wheel and, when steam is turned on, spins it up. All subsequent movements are performed automatically until the torpedo strikes and explodes upon the target. The remaining parts of the torpedo consist of the diving mechanism and the rudder.

The use of the fly wheel gives a great advantage in directive power, on account of its resisting any tendency to deflect the torpedo and to keep it pointed just as when it leaves the tube. This relieves it from the necessity of using vertical rudders, which is a gain in simplicity. While the Howell torpedo is more compact and lighter and can therefore carry a larger proportion of explosive to the whole weight of the torpedo, it is claimed that the Whitehead has greater range and velocity. It is reported that in the recent test of the Howell torpedoes now accepted, a speed  $\frac{1}{2}$  knot in excess of the requirements was secured for the prescribed distance of 400 yards.

### The Trimo Nipple Holder.

The Trimo nipple holder, made by the Trimont Mfg. Company of Roxbury, Mass., will hold nipples to cut either right or left hand threads. It holds the pipe firmly and releases instantly when reversing the die. It is adapted for either vise or machine use, and the nipple can be placed or removed without stopping the machine. The collar of this holder is suitable to fit the sleeve of the stock for the size pipe it is intended to hold, thus insuring a straight threaded nipple. When used in a machine the collar surrounds and fits the outside of the thread already cut and the rolls lock on the inside of the pipe, making the hold firm and true.

The construction of the holder will be understood from the engravings, Fig. 1 being a perspective view, Fig. 2 a section through the gripping mechanism and Fig. 3 a perspective view with parts broken away. On the outer end of the shank is formed the triangular cam B. In longitudinal recesses formed in the body are the locking rolls C, which are pressed against the cam faces

and that it has no desire to recruit from the ranks of the American Federation of Labor. On the contrary, its membership will be instructed to continue its affiliation with the American Federation. President Johnson says that for the last 12 months the iron workers of America have been subjected to heavy reductions. Their wages are unsatisfactory and there is a general feeling among iron workers that unless their conditions are bettered a bitter strife between employers and men must be the end.

### Sale of the Chapin Mine.

On the 29th ult. the famous Chapin iron mine was sold by Court Commissioner Hammond of Iron Mountain under foreclosure proceedings to satisfy the claims of the owners of the second mortgage bonds for \$648,771.88. M. A. Hanna of Cleveland was the purchaser, and with the purchase of 50,000 shares of the stock made on May 22 Mr. Hanna and those associated with him are now in full control of the valuable 30-year lease of the Chapin property.

permanent working of the mine. Mr. Hanna secured control of the property May 22, and it has been in operation since that time and will probably be worked to its full capacity in future. The Board of Directors elected at the annual election held June 24 are M. A. Hanna, Silas Hitchcock, Samuel Folsom, C. C. Barton, D. R. Hanna, A. M. Robbins and S. C. Hanna of Cleveland, C. A. Chapin of Niles, Mich., and R. C. Flannigan of Norway, Mich. Mr. Flannigan, as trustee, made the sale of the property. There was a meeting of the stockholders in September, at which it was agreed to offer no opposition to the foreclosure suit which had been begun by the bondholders.

### Conversion of a Steamer Into a Sailing Vessel.

The full rigged sailing ship "Lancing" which arrived recently from Calcutta, and is now in New York harbor, presents the interesting spectacle of a large steamer remodeled and converted into an efficient sailing vessel, a feat which, by shipping men, has always been considered next door to an impos-

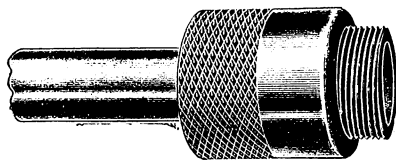


Fig. 1.—Perspective.

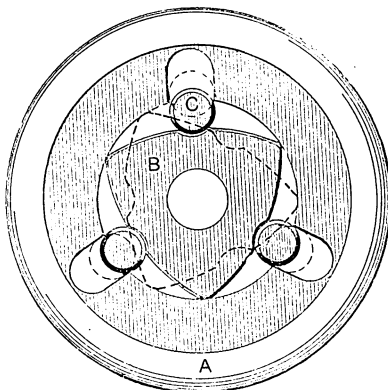


Fig. 2.—Cross Section.

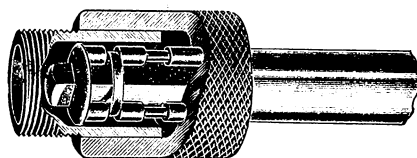


Fig. 3.—Perspective with Part of Shell Broken Away.

### THE TRIMO NIPPLE HOLDER.

by springs. The nipple is introduced between the collar A and these rolls. It is evident that when the collar is moved so that the cam occupies the position indicated by the dotted lines, the three rolls will be forced outward against the inside of the nipple, which will be held firmly between the rolls and collar. Moving the cam in the opposite direction will permit cutting the opposite thread. The greater the strain of cutter the greater the grip on the nipple, as the tendency is to move the rolls toward the outer ends of the cam.

**A New Labor Organization.**—Another ambitious labor organization has sprung into existence. Arrangements were completed at Indianapolis on the 23d ult. for the formation of the Federated Metal Trades of America, as it is to be designated. The new body will include every branch of the iron, brass and steel industries in America. The purpose of the promoters is to bring into a closer relationship all of the national organizations in this branch of labor. The officers of the new association are as follows: President, Lee Johnson of Kansas City, Kan.; vice-president, James O'Connell of Richmond, Va.; secretary-treasurer, William Anderson of St. Louis. The organizers say that it is not the purpose to antagonize any other organization

Mr. Hanna was the only bidder, and the price at which he obtained it and cleared away the claims of the bondholders was \$87,000. Besides the rights of the 30-year lease and all the machinery of the mine, which has cost millions of dollars (the mine having been sold a few years ago by the Van Dykes of Milwaukee to Ferdinand Schlesinger for \$2,000,000 after its profits had made the former owners wealthy), the purchase included a two-thirds interest, or 2000 shares, of the capital stock of the Hydraulic Power Company. This is a separate company, who own and operate the big hydraulic plant by which the power of the falls in the Paint River is used to convey compressed air for running the mines a distance of nearly 6 miles. At the time of its construction this was the largest plant of that description in the world. Three years ago the mine would have readily sold for \$2,000,000, exclusive of the Hydraulic Power Company's plant, which cost over \$500,000. The new owners have come into control through the purchase of 50,000 shares of the Chapin Mining Company stock at \$1 a share, and the purchase of the second mortgage bondholders' claims for only \$87,000. The first and second mortgage bonds have now been wiped out, leaving \$300,000 of third mortgage bonds unpaid.

This purchase practically insures the

sibility. The *Journal of Commerce* says that in remodeling her from a steamer to a ship her holds were gutted and made into 12 water tight compartments, which give to the vessel all the elements of safety and strength peculiar to that class of construction. She is 375 feet long, 45 feet beam and is of 2600 net tons. She is fitted with steam winches, windlasses, &c., and as a protection against fire has steam pumps capable of throwing 100 tons of water an hour. She carried on her last trip to Calcutta 100,000 cases of oil, and out of this large amount only 33 cases were damaged in any way whatever on reaching their destination, which shows that a steamer model is well adapted to sail if the reconstruction be carried on with scientific principles and that the movement of the vessel is steady and adapted to miscellaneous cargoes. The ship was built by Sir William Pierce at the famous Fairfield yards, and originally cost \$864,000. The "H. Bischoff," a sister ship of the "Lancing," has also just been converted from a steamer to a full rigged ship on the same plans and specifications as those in which the "Lancing" was changed, and is now sailing at the lowest insurance rates.

California wine producers have formed an association to control the future output of the vineyards and maintain prices.



## The Cornwall Ore Hills—I.

BY JOHN BIRKINBINE, PHILADELPHIA.

For more than a century and a half the Cornwall ore hills in Lebanon County, Pa., have been supplying blast furnaces located at or within easy transportation of this truly remarkable deposit of magnetic iron ore. The earlier utilization of the mineral obtained was confined to iron industries which could be reached by wagon haul, among which were the following:

The *Cornwall* (charcoal) *Furnace*, immediately at the ore hills, standing today as probably the best preserved relic of our older furnaces, has a record of continuous activity greater than any other in the country—viz., from 1742 to 1887, and is now in condition for blast. It is questionable, however, if this plant will resume activity, for, although close to the ore and convenient to woodland sufficient for a charcoal supply, the size of the furnace and its equipment will restrict the output so as to augment the cost of production. Nor do the special uses for iron which could be made with charcoal warrant an increase in price sufficient to encourage putting the furnace in blast.

The *Elizabeth Furnace*, built about 1750, in Lancaster County, made famous during the time it was controlled by Baron Stiegel, was long ago dismantled after being active for a century, but the property has remained in the Coleman family about 100 years and in the will of Mrs. G. Dawson Coleman (lately deceased) her desire is expressed to have it continue in possession of the descendants of Robert Coleman.

The *Reading Furnace*, now known as "Robeson," whose ore privilege has been and may again be the cause of much litigation, is another of the old furnace locations. Modern structures have, however, taken the place of the older and less pretentious plant to which the ore reservation was assigned. When in 1786 Peter Grubb, Jr., sold to Robert Coleman one-sixth interest in the Cornwall ore hills, reserving the right to take ore for one furnace forever, neither party to the contract could have imagined that this reservation would ever mean the right to take away 2000 tons of ore per week, for probably 100 tons was then looked upon as the limit of a single furnace's digestion in that time. But advances in metallurgy have made it possible for this one furnace at Robeson, to which the reservation has been conveyed, to smelt 300 tons of Cornwall ore daily, for which the heirs and successors of Robert Coleman must account to the other interests in the Cornwall Hills represented by the descendants and heirs of Peter Grubb, Jr. A one-half interest in this Robeson property is now held by the Freeman family, descended from Robert Coleman, who bought the one-sixth interest in the Cornwall ore hills with the above reservation.

The *Mount Hope Furnace*, also in operation for over a century, is another instance of the appreciated value of an ore right, but in this case the accounting was between two members of the Grubb family, the furnace carrying with it the right to an ore supply as long as it used charcoal for fuel, which one brother received and another accounted for to the joint owners of the ore hills. This furnace was active until within a few years, when at the death of one brother the property was purchased by the other brother at a price which allowed a large sum for the ore privilege, thus wiping it out.

The names "Colebrooke," "Martie," "Conewago" and "Mount Vernon" recall blast furnaces which were supplied by ore drawn from the Cornwall hill by wagons, but the small output of each plant, and the necessity of scattering the iron works so as to secure a supply of charcoal made but moderate demands upon the deposit.

### Mining Methods.

In the earlier exploitations of the ore hills individuals who owned interests in the property, or who had the right to mine ore, had the ore dug and their wagons loaded at the portions of the property which were apparently desirable, some of the older excavations bearing the names of specific furnaces. About this time there were large amounts of "nigger head" ore available. This ore lying on or near the surface, having been weathered, the sulphur and some of the other objectionable ingredients leached out, was of superior grade, both on account of the high percentage of iron and because of its comparative purity. There is still considerable of this "nigger head" scattered over unwrought surfaces, but the amount is proportionately small. Some fine specimens of lode stone were obtained and an occasional piece is still discovered.

Another practice formerly followed was to expose large faces of ore to atmospheric influences, a fair proportion of the sulphur efflorescing on the surface and being washed off by rains. The sulphur and copper in the ore mined from Cornwall produced a red short iron, and except for some special purposes, such as plate for cut nails, it was not considered desirable (its low phosphorus contents not being appreciated until Bessemer steel was produced) since these interfered with the metal being applied in general to foundry purposes.

The deposit has always been an open work, no underground mining having been necessary except for following a vein of copper a few feet in advance of regular excavations. Until late years all the mining was done above the level of the creek which separates the two prominent hills, but present exploitations in the Middle Hill are below this level, requiring hoisting appliances, and the removal of a small amount of water. The spiral railway which encircled the Big Hill twice and a half will soon be no more, because the bulk of the ore has been taken out of this portion of the deposit. A general description of the Cornwall ore hills, prepared by E. V. D'Invilliers, is found in the Transactions of the American Institute of Mining Engineers, Vol. XIII, page 873.

### Transportation.

The construction of a plank road, 6 miles in length, to Lebanon, where boats were loaded on the Union Canal, and subsequently the construction of a railroad connecting the ore hills and the canal, and later also with the Lebanon Valley branch of the Philadelphia & Reading Railroad, broadened the available market for this ore. Reading and other Schuylkill Valley points, Harrisburg, Lancaster, Columbia and other locations on the Susquehanna River were supplied with Cornwall ore, and it was also sent to Pottsville, Philadelphia, Scranton, &c. Some 20 years ago the canal was abandoned. About a decade since the transportation facilities were greatly improved, a competitive railroad being constructed paralleling the Cornwall Railroad to Lebanon, where there are five furnaces, and

other lines were completed to connect with the Reading system at Manhiem, and with the Pennsylvania system at Conewago. About this time the Lake Superior ores began to invade Eastern Pennsylvania, their excellent character contributing to restrict the market for Cornwall ore to a local production of Bessemer pig iron, so that at present the furnaces using ore from the Cornwall hills cover practically the same district which was reached by wagon haul a century ago. An exception may be made to the roasted ore now being sent to Scranton by the Lackawanna Iron & Steel Company, which is probably done merely as an experiment, for testing in the company's blast furnaces at Scranton mixtures of which Cornwall ore forms a part.

At present two of the five furnaces at Cornwall dependent upon Cornwall ore must be reconstructed if they are to be operated, and the third, the old charcoal furnace, is retained more as a relic than as an industry. None of the furnaces located immediately at the ore hills have been in operation for over a year. At North Cornwall, 1 mile from the ore hills, there is one furnace which has been idle for four years. At Lebanon, 6 miles from the ore hills, there are five furnaces, all of which are now active or being relined. At Sheridan, distant 16 miles from Cornwall, there are two furnaces, both in blast. At Robeson, 20 miles from this ore bed, one furnace is in operation, and it is this plant which controls the reservation to take from the hills the ore for one furnace.

In the past ten years a total of 6,192,852 long tons of ore have been taken from the Cornwall ore banks, the maximum annual output being 769,020 long tons. With one exception this is the largest quantity taken from an American iron ore mine in one year. The total quantity of iron ore which this property has contributed since the earliest exploration now exceeds 12,500,000 tons, therefore nearly one half of the output was mined within the last decade.

### The Ownership of the Hills.

Although Peter Grubb was at one time sole owner of what is now recognized as the Cornwall ore hills, his sons and grandsons disposed of their holdings at various times until Robert Coleman possessed five-sixths and the heirs of Peter Grubb one-sixth interest. These relative proportions were maintained by descendants of Grubb and Coleman until 1894, when the first transfer of an interest in the property for over 100 years otherwise than by descent was made by the purchase on the part of the Lackawanna Iron & Steel Company from the assignees of the holdings of Robert H. Coleman. The division into sixths was naturally followed by partitions among members of families, and when the Cornwall Ore Banks Company were formed the interests were divided into 96 parts, of which one branch of the Coleman family held 50 parts, another branch of the same family 30 parts, and the Grubb family 16 parts. Subsequently further divisions and transfers were made and at present writing the interest in the Cornwall ore hills may be summarized as follows:

	Shares.
Estate of G. Dawson Coleman (deceased).....	15
Seven living heirs are represented by these undivided shares.	
Estate of Robert Coleman (deceased).....	15

Now in litigation, for which there are four claimants—two in France and two in the United States.	
Mrs. Rogers (R. H. Coleman, trustee)	15%
Lackawanna Iron & Steel Company	15%
Formerly interest of R. H. Coleman	
Mrs. Alden	6 1/4%
Freeman estate (four heirs)	12%
Grubb family	16%
This is divided among six heirs.	
Total	96

It will thus be seen that subsequent partitions may make troublesome fractions. Already two members of one family each own one and nine-sixteenths shares, four members of one branch of the Grubb family each have two shares and two of another branch represent, respectively, three and one half and four and one-half shares (if they may be so called). However, if the entire property be estimated at the price paid by the Lackawanna Iron & Steel Company—viz., \$135,000 per share—its total value of \$12,960,000 could be divided into small fractions, each of which would represent a liberal sum of money.

As at present divided a combination of representatives of at least four share holders is necessary to control the policy of the ore banks company, which is not a corporation, or, in fact, a formal partnership, but rather a tacit agreement or an association of owners, without any specific limitation of time (but which has existed for about 30 years), by which the ore banks are operated for the general benefit of the owners under one management. By this arrangement all of the ore is mined except that which is taken to supply the Robesonia Furnace, the various proprietors sharing in the profits of exploiting the deposit in proportion to the interests which each represents.

#### The Robesonia Ore Right.

In this connection it may be of interest to quote the phraseology of this reservation, under which the Robesonia Furnace is now, and under which it is claimed that this or some other blast furnace to which the reservation may be assigned can be operated as long as ore is won from the Cornwall ore hills. In the articles of agreement between Peter Grubb, Jr., and Robert Coleman, dated September 26, 1785, for the sale of one-half of Peter Grubb, Jr.'s, interest in the Cornwall Furnace and other lands he reserved for himself, "his heirs and assigns the liberty of digging, raising and hauling away a sufficient quantity of iron ore to supply the furnace which he purchased of John Patton, or any other furnace he may erect elsewhere, provided there is not more than one furnace blowing at the same time." To carry out this agreement, on May 9, 1786, this grandson of the original Peter Grubb, developer of the ore hills, sold to Robert Coleman for the sum of \$8500 gold or silver, one-sixth interest in Cornwall Furnace, Hopewell Forges, mineral and other lands, including the Cornwall ore hills, "saving and excepting unto the said Peter Grubb, the grantor, his heirs and assigns forever the right, liberty and privilege at all times hereafter of entering upon the premises hereby granted and released, with his and their horses, carts, carriages and servants, and of digging, raising and hauling away a sufficient quantity of iron ore for the supply of any one furnace, at the election of Peter Grubb, his heirs or assigns, at all times hereafter, anything hereinbefore contained to the contrary in anywise notwithstanding," and at the end, the deed of conveyance again mentions the reservation of this right, thus: "saving and excepting always thereout, the right, liberty and

privilege hereinbefore reserved unto the said Peter Grubb, his heirs and assigns, of a sufficiency of iron ore for the use of one furnace forever."

It is not surprising that legal proceedings should have been instituted to determine the scope of the reservation and the influence, if any, which the changes due to advances in metallurgical science would exert; for the one-sixth interest Robert Coleman purchased of Peter Grubb, Jr., with the reservation being undivided, was incorporated with the two-thirds interest which he also purchased, and the entire holdings of the Coleman heirs (five-sixths of the Cornwall ore hills) have been and are now held responsible for the ore removed under this grant. In other words, there are three distinct parties specially interested in this ore reservation—viz.: 1, The stockholders of the Robesonia Iron Company, which has succeeded Peter Grubb, Jr., as grantee; 2, the heirs of Robert Coleman, the grantor, who now own the five-sixths interest in the ore hills, and, 3, the members of the Grubb family, who own one-sixth interest in the ore hills, which holding is not a party to the reservation. Therefore the ore taken from Cornwall by the Robesonia Iron Company is chargeable to the five-sixths interest held by the Coleman heirs and by the Lackawanna Iron & Steel Company in proportion to their holdings, and not to the one-sixth interest now owned by the Grubb heirs. The result of the litigation over this reservation may be summed up at the present time as indicating that the grantee has the right to take advantage of all improvements, and is not restricted as to the quantity of ore to be taken, except that the amount must not exceed the requirements of one blast furnace; but the grantee cannot maintain two furnaces, so that one goes into blast on Cornwall ore immediately at the close of a campaign by the other using the same material, but the furnace must be subject to the ordinary lost time due to repairs, relining, &c.

The grantee has the right to enter the ore property and remove the ore in its own way, and it can select, and has selected specially advantageous ground for mining operations, but must confine its workings so as not to unnecessarily interfere with and jeopardize those of the owners. The grantee has the right to take "a sufficiency of iron ore for the use of one furnace forever," and may elect, should it not desire to smelt it in the furnace owned or controlled, to assign or transfer said reservation to some other furnace. At the time that the blast furnace, farm and woodlands, houses, &c., which make up the Robesonia Iron Company's property changed hands, it was estimated that the ore reservation entered into the purchase price for about \$500,000. If this figure is correct the value of the ore right would, at present rate of consumption, represent a cost of 30 cents per ton of ore, if interest on the above estimated value of the reservation is calculated at the rate of 6 per cent. per annum. The mining operations for the Robesonia furnace are carried on independently, but without interference with those of the Cornwall Ore Banks Company, the owners of the furnace having elected to mine the "ore to supply one furnace," provided for in the reservation of Peter Grubb, Jr., for the Berkshire Furnace, which was subsequently assigned to the old Reading Furnace, the archetype of the Robesonia plant. About one-fifth of the present output of the ore hills is now mined under this reservation.

#### A New Bridge at Pittsburgh.

During last week bids were asked for by the Director of Public Works at Pittsburgh for the erection of a bridge over the Monongahela River, connecting Pittsburgh with the South Side. The bridge will be known as the Soho Bridge, and will extend from Forbes street, at Brady street, Soho, Pittsburgh, to Wharton street, at South Twenty-second street, South Side, Pittsburgh. The contract for the erection of the structure will be let in about three weeks and the specifications require it to be completed within one year from November 1, 1894. The bridge is expected to cost about \$400,000, which is said to be one-third less than it would have cost a few years ago. The Soho bridge will be of steel and not like any other structure in Pittsburgh in appearance. Its extreme length will be 2480 feet, which is longer than any other bridge in that city. The bridge proper will consist of two side arms, each 260 feet long, and a central double rib stiff arch 520 feet long. The south approach will be 278 feet long. The north approach will be a steel viaduct 815 feet long to Forbes street. There will be two sidewalks 11 feet 3 inches wide on the approaches and 7 1/2 feet wide on the main span. The driveway will have two tracks, one on each side, with an 18-foot space between for vehicles. At each entrance to the main span an ornamental portal 70 feet high will be placed. The bridge floor will clear the river, at full pool, by 54 feet. On the north side it will clear the Baltimore & Ohio Railroad tracks by 27 feet and Second avenue by 35 feet. Stairs will lead from the bridge at Tustin street and Second avenue. Three stone piers will support the bridge. The approaches will rest on structural steel piers. Spans over the streets will be ornamented. It is expected that the company getting the contract will have all material prepared during the winter, so that when the spring opens there will be no delay in construction. Copies of the specification and blue prints have been mailed to all the prominent bridge building firms in the country.

The plant of the Crescent Sheet & Tin Plate Company, Cleveland, Ohio, will, it is announced, be in full operation by April 1, 1895. The land on which the mill will be established is a tract of 6 1/2 acres on Bessemer street, Cleveland, which the company have purchased at a cost of \$14,500. Contracts have been placed for hot and cold mill machinery and for four Corliss engines. The buildings and equipment will cost about \$150,000. The production of the works will be black and terne plates exclusively. The buildings, for which the contracts were let this week, will be of iron and brick. The works will give employment to about 250 men. The temporary offices of the Crescent Sheet & Tin Plate Company are at 312 Perry-Payne Building, Cleveland. The officers of the concern are: President, H. P. Macintosh; vice-president, B. F. Arthur; secretary and treasurer, J. A. Matthews; and superintendent, James Paton.

The Leadington Lead Company, Leadington, Mo., have closed down their large mines at that place, throwing a large number of men out of employment. They claim that the present low price of lead does not justify them in working the mines.

### Norton Brothers' New Factory.

Norton Bros. of Maywood, Ill., dedicated their new tin can factory on the evening of the 1st inst. This factory has been built to take the place of the one on River street, Chicago, which was burned on February 19. It will be used for the manufacture of all kinds of tin packages, plain and decorated, and of any size or shape. The building is a brick structure, two stories high and 250 feet square, erected almost without regard to expense so as to embody the most perfect labor saving devices and at the same time provide the workmen with the highest comforts and conveniences. It is pronounced one of the finest factories now in existence by

the kindly feelings of the employees toward their employers, Mr. Fox at the conclusion of his remarks presented a testimonial of esteem signed by the employees and engrossed on parchment in the works. Dancing followed, after which a generous collation was served. The chronology of this company is as follows: 1868, business established in Toledo, Ohio, as E. Norton; 1870, firm changed to Norton & Fancher; 1871, removed to Chicago, office and factory at 63 and 65 South Canal street; 1873, opened office at 10 State street, firm changed to Norton Brothers; 1874, removed office and factory to 44 and 46 River street; 1885, opened factory at Maywood; 1890, incorporated under style of Norton Brothers, commenced manufacture of

### A Novel Hot Blast Heating Plant.

The machine shop of the Fuel Gas & Mfg. Company of Brinton, Pa., has been provided with a hot blast heating system embodying several novel and interesting features, particularly in the arrangement of the hot air piping. The designs for this system were made by Julian Kennedy of Pittsburgh and the Buffalo Forge Company of Buffalo, N. Y., built and guaranteed the plant. Fig. 1 is a longitudinal sectional elevation of the building, Fig. 2 a plan view and Fig. 3 a transverse section. The hot blast apparatus is shown at the extreme left in Fig. 1. The building is 50 feet wide by 200 feet  $2\frac{1}{2}$  inches long, the machine shop proper being

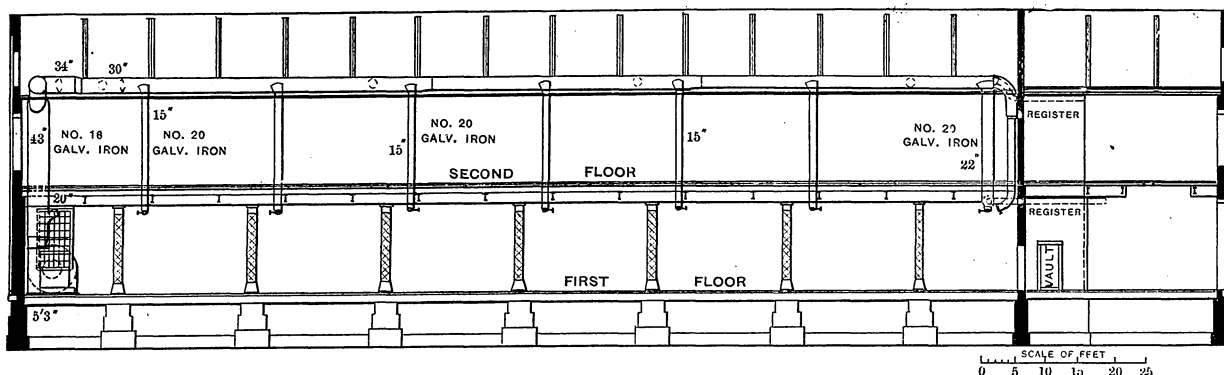


Fig. 1.—Longitudinal Sectional Elevation.

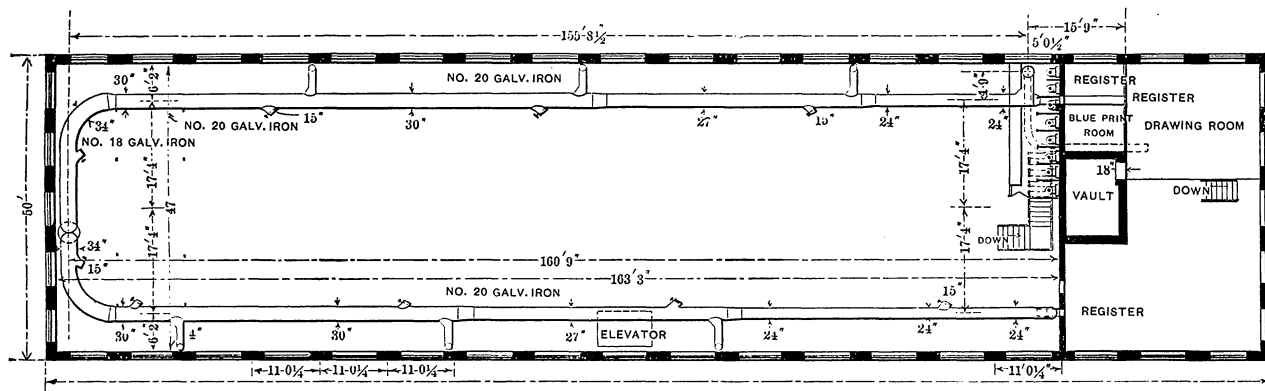


Fig. 2.—Plan.

### A NOVEL HOT BLAST HEATING PLANT.

those competent to express an expert opinion. The dedication of the building was made a gala occasion for the employees and residents of the vicinity. A short programme of exercises was prepared, as follows: Tender of the building by the architect, F. R. Schock; acceptance by the president, O. W. Norton; "Maywood of the Past," Harrison P. Nichols; "Maywood of the Present," Gen. Wm. Sooy-Smith; "Maywood of the Future," H. F. Frink; "Retrospective and Prospective," Edwin Norton; "Our Health, Our Wealth and Our Happiness," Samuel Fox, an employee. In his address Edwin Norton referred to the fact that in the quarter of a century of the firm's existence as manufacturers they had never had a strike. He also stated that in the months of July, August and September the tin plate factory connected with this plant had turned out over 9,000,000 pounds of the finest quality of tin plate. As an evidence of

tin plate; 1892, built present tin house and sash weight foundry; 1894, River street factory destroyed by fire February 19, opened offices in Masonic Temple, February 20; opened warehouse, corner Sixteenth and Johnson streets, April 1; opened new factory at Maywood, November 1. The directors of the company are Oliver W. Norton, Edwin Norton, Henry M. Norton, Horatio N. Norton, Lawrence A. Norton, Henry F. Akin and W. L. Gifford. The officers are as follows: Oliver W. Norton, president; Edwin Norton, vice-president; W. L. Gifford, secretary, and O. P. Swift, treasurer.

The Neafie & Levy Ship Building Company of Philadelphia have just turned out from their yards a handsome twin screw steamer for the Cuban trade, named the "Purissima Concepcion." The vessel is 242 feet over all, 40 feet beam, and 12 feet depth of hold. She is built for passengers and freight.

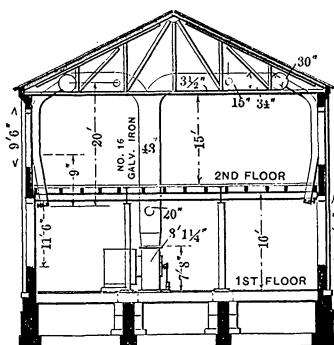
155 feet  $8\frac{1}{2}$  inches long, the offices occupying the remaining portion. The drawings show the arrangement of the piping and also give the thickness and diameter of the several sections.

The heating apparatus consists of a 100-inch Buffalo fan and a 4000 feet capacity heater, the fan being driven by a  $6\frac{1}{2} \times 8$  inch direct attached upright engine. The wheel inside the fan casing is 71 inches in diameter by 33 $\frac{1}{4}$  inches wide. At 340 revolutions per minute the fan will displace 48,360 cubic feet of air.

The entire hot air piping is carried clear up to the roof trusses and thence is brought down, with outlets on second story, into the first story. This is an unusual application, and the piping would have been distributed equally on each floor but for the presence of so much machinery and shafting. As indicated in Figs. 1 and 3, the uptake from the heater is 43 inches in diameter. At the top this branches to each side,

along which extends, on the roof trusses, a galvanized iron pipe, which is 30 inches in diameter where it joins the branch, and 24 inches in diameter at the other end. In these two lines of pipe are openings for heating the second story, and from them descend pipes for heating the first story, as shown in Figs. 2 and 3.

The temperature guaranteed on this plant was 65°, from zero outside, the calculation being to use exhaust steam from the main engine in the day time and the exhaust steam from the fan engine at night, together with live steam when necessary. Except during the coldest weather the exhaust steam from the fan engine is sufficient to heat the building above the freezing point at night. Outside of the repairs,



A Novel Hot Blast Heating Plant.—Fig. 3.—Transverse Section.

there is practically no cost, with the exception of the live steam used for running the fan engine, which is a very small matter. Part of the air is taken from the factory and part from outside, most of the air being used over and over again as a matter of economy. There being comparatively few people in the building, per cubic foot of space, the air is not vitiated to a great extent by respiration. In a factory using more power it would be possible to do the heating in the severest weather with exhaust steam alone and taking all the air from outside the building.

The condensation in one of these heaters is from three to five times as great as in the same amount of direct heating, either running around the building in the form of 1-inch pipe, or per square foot of direct radiation. Of course, by drawing the air by the action of the fan direct from the outside and passing nothing but cold air over the coils a greater amount of steam is condensed than when taking the air from the inside. If there is no other use for the exhaust steam, however, then the amount condensed does not enter for consideration to any great extent.

We may add that under favorable conditions the larger part of the piping employed in the building just described could have been dispensed with. In many plants of this character, the apparatus would be placed near the offices, and a stand pipe would be run through the center of the building to the different floors, and this, with the office connections, would complete the layout. The cost of installing a plant of this character, exclusive of the galvanized iron work, is in the neighborhood of \$1250.

The Pennsylvania Railroad Company have issued orders on the Camden and Amboy Division for all departments to

resume work on eight hours' time, six days each week. For the past 13 months the shipyards, machine and car repairing shops only worked five days each week, while the trainmen worked only half time.

### The Practical Working of the "Chicago's" Machinery and Boilers.

Among the first vessels proposed for the new navy were the "Dolphin," "Atlanta," "Boston" and "Chicago," the latter being by far the largest of the four. The "Chicago" has been over five years in commission, and as her boilers have lately been extensively repaired at Antwerp and her machinery thoroughly overhauled, it seems a proper time to show just what has been the experience of those who have been in her engine and fire rooms and watched the working of the engines and the behavior of the boilers during that time.

#### Machinery.

At the time the "Chicago's" machinery was proposed the only solution of the problem as to how her pistons were to have the proper length of stroke seemed to lie in giving her beam engines. Triple expansion was in its infancy at the time, and so compound engines were agreed upon. The steamer "Louisiana" was then running between New York and New Orleans and she had beaten the record. As her engines were beam engines it was thought that that type would answer very well for the war ship, and after many differences and much discussion that type was agreed upon. We are all accustomed to see our paddle wheel steamers with their walking beams working in a fore-and-aft direction, away up above the uppermost deck, but those in the "Chicago" are down under the steel protective deck, and instead of working fore-and-aft they are placed athwartships, two for each propeller shaft. Steel had not made as much progress in those days as it has since, and, consequently, the weights of the various parts of the "Chicago's" machinery are well in excess of what they would be were they built to day. The surface condenser is very heavy, for example, as it is made of cast iron, and the beams are built up of cast and wrought iron. With this peculiar kind of machinery there are too many bearings and there is great difficulty in keeping the various parts in adjustment and alignment. When making 45 revolutions per minute with the main engine, the average speed under ordinary conditions of weather is 10.7 knots, the average power developed being 1231 horse-power which includes all the auxiliaries. At this speed, which is the average sea rate of the ship when cruising, 60 gallons of lubricating and 10 gallons of cylinder oil are required for the day's consumption. This gives 0.049 gallon of lubricating oil per day for each horse-power.

#### The Condensers.

The beam centers are on top of the condensers, and as they are very heavy and the power is transmitted through them it necessitates the condensers being, as above stated, extremely bulky. These surface condensers have always been satisfactory as far as the vacuum was concerned, 26 to 27 inches being readily maintained. This, of course, is largely due to the excellent working of the air pump, which is an independent air and circulating pump of the Blake pattern.

In addition to the main condenser

there is an auxiliary condenser in each engine room which receives and condenses steam from all the auxiliary machinery. This idea was somewhat of an experiment on board the "Chicago," although to-day it might be somewhat difficult to recognize it as an experiment, and its workings are considered as being eminently successful. These auxiliary condensers have combined air and circulating pumps which are very good, barring one objectionable feature, and that is the packing boxes are too shallow, making it necessary to squeeze the life out of the packing before getting it properly tight, and so using up the packing much too quickly. These condensers are not both in use at once, but are running alternately, month and month about. Their tubes have been once renewed after being in use four years, owing to their being so badly worn as to be very brittle. When the tubes were broken, after removal, the fracture showed but very slight, if any, metallic appearance, but they were more like clay in substance. The object of these various condensers is to save fresh water for the boilers, in which particular they are considered as being very successful. To each main and each auxiliary condenser is fitted a "bleeder valve" which allows steam pressures in excess of those for which the safety valves are set to be reduced without raising the valves and at the same time avoids the nuisance of blowing off and saves fresh water.

#### The Distilling Apparatus.

In speaking of condensers it is as well to say a few words regarding the fresh water distilling apparatus. The distillers, two in number, are supplied with steam from the evaporators located in the compartment just abaft the berth deck and inside the forward bulkhead of the forward fire room. One object in placing the evaporators in their present location is to allow the pure fresh water to run by gravity to the tanks that are down in the hold. A very satisfactory rate of distilling is about 4000 gallons per day of pure water, at a temperature not too high for almost immediate consumption.

Once a month the coils from the evaporators are removed for scaling. In this time there is usually about  $\frac{1}{4}$  inch of lime scale deposited. The coils in the distillers are removed once a year. Scale is known to be a very bad conductor of heat, so that in cleaning the walls of the evaporators their shells are never scaled, the deposit frequently being  $\frac{1}{4}$  inch in thickness. The plan has prevented the passage of heat into the compartment, which, in spite of every precaution, is often too high for living purposes.

Steam from the main boilers, passing through closed coils in the evaporators, gives up its heat and evaporates the sea water surrounding them. Physics teaches us that, in distilling water, we are rid of all impurities—that is, nothing but pure water passes over as vapor. Experience has, however, demonstrated that certain volatile matter is also carried over, a fact apparent to any one who has tasted recently distilled water and objected to the oily taste. In spite of all care and precaution there are still times when it seems almost impossible to get rid of the fishy taste, especially in localities where jelly fish are found in large numbers, or where fish go to spawn.

Where the condenser tubes,  $\frac{3}{8}$  inch in diameter, pass through the tube sheet they are packed into a ferrule of *papier maché*,  $\frac{3}{8}$  inch outside diameter. The

end of the tube is slotted and drifted out to prevent the packing from coming out of the tubes and to prevent creeping. This method has been found to answer every requirement, besides being more economical than the use of screw glands or followers.

The present way of installing the independent air and circulating pumps is slightly disadvantageous, owing to the inconvenience of getting at the valves of the air pumps, the space being very cramped. This defect has been remedied in vessels of later construction. The advantages, however, of this independent pumping system far outweigh all other considerations, and are to be found in the fact of its being possible to maintain an excellent vacuum of from 26 to 27 inches, even in tropical waters. In former days a satisfactory vacuum to start off with was only obtainable under great difficulty, whereas now one half hour before the engines are needed one has but to start the independent auxiliary pumps and the engine is always ready to start upon the signal from the bridge. The custom on board the "Chicago" has been to start these pumps an hour before the main engines are to be used, and to keep them running from six to ten

faces to be oiled and adjusted between piston and crank shaft, which is three, if not four, times as many as are ordinarily found in other types of machinery. In spite of the fact of many of these bearings oscillating through comparatively small arcs, they manage to heat with unexpected rapidity and consequently require great care and attention. As has been remarked above, the use of cast iron instead of steel makes the weight excessive and is consequently a great disadvantage, as the matter of weights is so all important a consideration. To these disadvantages may be added that of the slow rotative speed of the machinery.

quite up to date, and so fall short of the requirements of a modern cruiser. Still as they are believed to be somewhat unique a result of experience with them is a matter of curiosity as well as of interest.

The boilers, Fig. 1, are cylindrical, and were designed for a working pressure of 90 pounds per square inch above the atmosphere, with a total grate surface of 672 square feet and a total heating surface of 19,950 square feet, furnishing steam for about 5000 horsepower with forced draft on the closed fire room system. The total power is divided among seven boilers, five of which, A, B, C, E and F, are double

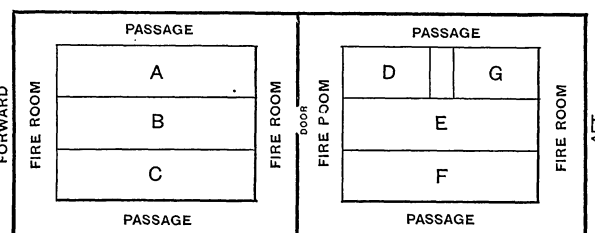


Fig. 1.—Diagram Showing Arrangement of Boilers.

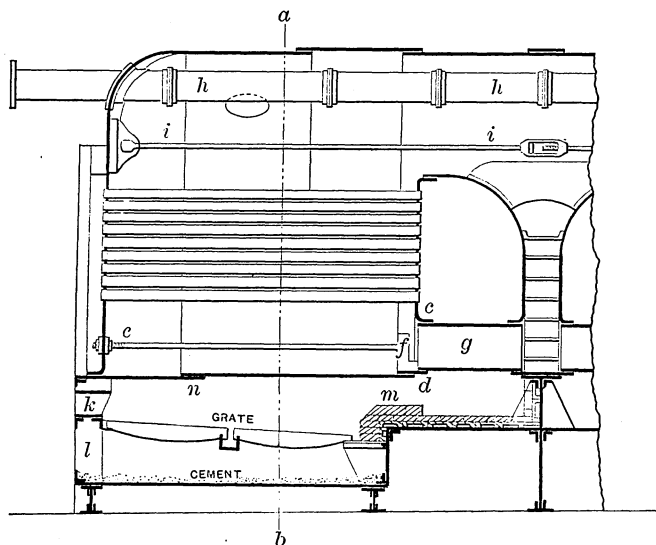


Fig. 2.—Vertical Longitudinal Section of Boiler.

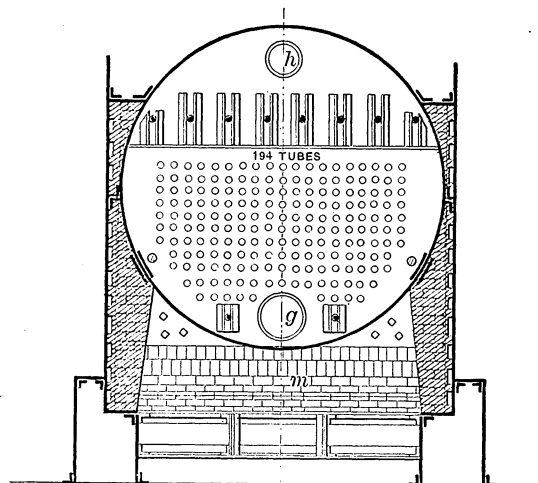


Fig. 3.—Cross Section, on Line a b of Fig. 2.

c d, flange of back tube sheet connecting water tube or flue g; e f, lower braces; h, dry pipe; j, main braces; k, furnace mouth; l, ash pan opening; m, bridge wall; n, girth seam.

#### PRACTICAL WORKING OF THE "CHICAGO'S" MACHINERY AND BOILERS.

hours after the engines are stopped. This latter custom has been adopted in order to handle any surplus steam that may be generated, but more especially to prevent the drying up and leaking of the paper packing of condenser tubes, which would admit salt water to the fresh water side. The two air pumps and the circulating pumps are worked by one steam piston, and with them no trouble has been experienced on board the "Chicago."

#### Beam Engines for Screw Propulsion.

The result of experience with beam engines for screw propulsion shows that the type has not become as popular as was anticipated by its advocates, who have been instrumental in having it placed on board various types of vessels, from the size of a tugboat to the "Chicago." As installed on board that cruiser, there are 18 working sur-

While but little real trouble has of late years been experienced with the machinery, it has by no means impressed itself favorably upon the minds of those who have had the handling of it, but it is admitted that it has some few advantages, and among them is the placing of the cylinders low down in the ship, and the fact of their being vertical reduces largely the wear from friction. The Stephenson double bar link has also brought forth favorable comment, as it has proved to be more easily adjusted for wear than the ordinary slotted link.

#### Boilers.

The boilers of the "Chicago" were also very much of an experiment, and while they have a number of excellent features, which will be mentioned later on, the fact of their not having been duplicated in later vessels may be considered as proving that they are not

ended, 9 feet diameter of shell, and 24 feet 6 inches long; and the other two, D, G, single ended, of the same diameter of shell, but only 11 feet 10 inches long. The two single ended boilers are placed back to back, with a light bulkhead lined with fire brick between them, the two together occupying the same length of floor space as one of the double ended boilers. The boilers are grouped in two large water tight compartments below the protective deck, with their longitudinal axis in the fore-and-aft direction, which arrangement gives four athwartship fire rooms.

The peculiarity of these boilers is the introduction of the brick setting on very much the same principle that one sees with boilers in ordinary use on shore. About 6000 bricks are required for each boiler of the double pattern. At the time these boilers were built 72 inches was about the widest steel boiler plate rolled, and to carry out the de-



sign it was found necessary to put a transverse seam about 30 inches from the furnace doors. This gave a double thickness of metal in a hot part of the furnace, and also one subject to great changes of temperature, owing to the cold blast striking it whenever the furnace doors were open.

It must be clearly understood that that portion of boilers usually known as the crown sheet is in this type represented by the lower portion of the cylinder against which the heat impinges. The greater portion of the trouble given by these boilers is due to these transverse seams, which, owing to frequent expansion and contraction, have been the cause of serious leaks both in the seam and in the rivet holes. The bottoms of these boilers have buckled down at various times and the location of this trouble has almost invariably been close to these seams.

The accompanying drawings, Figs. 2 and 3, show longitudinal and cross sections of one of these double ended boilers, from which it may be seen that the furnace is entirely external to the shell of the boiler, and will explain what has just been said regarding that part of the boiler usually called the crown sheet. The girth seam is also shown, and in regard to this it is probably quite well understood that the improvements in the foundry now admit of plates being rolled of such size that a girth seam is no longer a necessity.

When undergoing repairs recently at Antwerp, Belgium, it was found that these bottoms had become so dangerously weak that it was no longer safe to use them and it was found necessary to put new bottoms in both ends of the three main boilers and one of the single boilers. In order to do this work as economically as possible it was not deemed advisable to cut away the hatches or any of the beams or deck planking, so that the plates had to be hoisted and lowered through the hatches. So, though larger plates might have been obtained, those actually used were in two pieces for each boiler, but with this all important difference, the longitudinal seam was in this case at the lowest line protected by the brick partition wall. This change was made to prevent the exposure of the seam to the direct heat of the fires. The half boiler has been about four months in use and has thus far developed no weakness, whereas the boilers, as originally fitted, gave more or less trouble from the time the ship first started on her cruising from the New York Navy Yard.

In these days when everything seems to be more or less sacrificed for the extra fraction of a knot to be made on the trial trip boiler tubes have, like many other features, been made and fitted in a way that seems to result in greater trouble and vexation than appears at all necessary. Aboard the "Chicago," however, they have given a minimum amount of trouble. There have been fewer leaks at the ends exposed to the fire and less bother with the tube sheets than has been the case with other vessels that have served in the same squadron. In a long trip at sea where several of the vessels found it necessary to clean tubes almost daily, once a week was sufficient for the "Chicago's" tubes. The tubes are made of steel and are 3 inches in diameter. It can readily be understood that there is far less liability to choke up with tubes of this size than with those of smaller diameter that are in use in vessels of later construction.

The steam drum, for use when not in

action and in ordinary cruising, is inclosed in the smoke pipe and at about the level of the gun deck. In action this drum is not used, steam being taken directly from the boilers through another set of stop valves, all of which are below the protective deck. The steam drum gives dry steam for the main engines and has effectually insured there being no water carried over to the cylinders.

#### Brick Setting.

Originally the furnaces were 7 feet long by 8 feet wide, and were fired through two furnace doors. By this arrangement, however, the fires were checked to a certain extent in the entire furnace whenever either door was opened. To obviate this objectionable feature a central partition wall of fire brick, extending from the ash pit to the boiler bottom, was constructed in each furnace, dividing it into two independent furnaces each having but one door. It is this partition wall that protects the longitudinal seam in the repaired boilers already referred to.

Regarding the bearing that the heating of these bricks has upon the boilers there has been considerable discussion, and the decision as to whether this feature is a success or not may well be considered as the most vital point regarding them. While opinions may differ more or less as to the advantage of this type of boiler, as a whole, those who have seen the practical working of it seem to be quite agreed in relation to this division of the furnaces that while the bricks have cut off a portion of the heating and grate surface, and have thereby proved disadvantageous, this has been more than counterbalanced by having smaller furnaces capable of being more carefully regulated. When these boilers were in process of construction they were very severely criticized by foreign engineering periodicals, but the experience of over five years has proved a number of these adverse criticisms to be almost entirely groundless. The reputation of the "Chicago" as offering a steady gun platform when at sea is excellent, but upon one or two occasions she has had her share of bad weather and heavy seas, in which she has rolled and pitched about considerably. During this bad weather not a brick was displaced, nor were there any signs of cracks in the masonry. The high temperature obtained in a brick furnace fuzes the ends of the bricks and the cement into one entire surface, so that whenever it becomes necessary to remove any of the fire bricks they have to be dug out in pieces. This high temperature means so much more rapid rate of conduction of heat.

By far the greatest advantage in having this high temperature is the more complete combustion of the fuel.

Another advantage possessed by the brick furnace lies in the fact that the large number of bricks form a reservoir of heat, which is given off at the time of firing, or working the fires, and allows a constant steam pressure to be maintained. Upon one of her trips the ship ran for ten days at 42 revolutions per minute and did not vary one-tenth of a revolution per minute during the entire run.

The regularity of her speed was commented upon during the recent naval review, and, so steady was the pace, the "Chicago" was selected as the ship upon which all others were to regulate the revolutions of their engines. When she was in the lead the distances and bearings between the other vessels of the squadron were noticeably more reg-

ular than when any of the other flag ships took the head of the column.

The care and attention bestowed by the officers on duty in her engine rooms upon the working of her machinery and the firing of her boilers, and the cleverness and alacrity they displayed in carrying out all orders in relation to handling the engines, are not at all reflected upon by these remarks, for what they did has been recognized and favorably commented upon by those highest in authority. Fresh water is always used with the boilers and at least six hours are allowed for getting up steam. Another precaution is that the fires are never hauled, but are allowed to gradually die out in the furnaces, thereby preventing largely that unequal expansion and contraction that have frequently proved so very disastrous.

Through the back connection of the double ended boilers are water flues, *g* in the drawing, some 14 inches or so in diameter, to allow a proper circulation of water between the ends of the boilers. With these flues there has been more or less trouble. The stress is intensified owing to the boiler shell being cut away to allow the entrance of the heated gases to the back connection. The furnace at each end has its independent combustion chamber, which extends across the entire width of the boiler, the side walls being a continuation of the side walls of the furnace and are lined with fire brick. A water leg is formed between the two combustion chambers, the bottom of it being horizontal and the width the same as that of the boiler, the sides being vertical and striking in tangent to the shell at the ends of the horizontal diameter. Above the water tubes is one row of braces  $2\frac{1}{2}$  inches diameter, and two braces 2 inches diameter are fitted between the front and back tube sheets at each end of the boiler.

It has been found necessary upon two or three occasions to replace the water flues *g* because the steel became crystallized and cracked. It has also been found that the longitudinal braces *e f*, between the tube sheets and below the tubes, bend upward. The tube sheet below the lower row of tubes bends toward the front of the boiler, which irregularities have great bearing upon the troubles in connection with the water flue. The fact that the bottom of the boiler, that part already referred to as taking the place of the ordinary crown sheet, sags may possibly be considered as the cause of trouble with the water flues.

The longitudinal braces below the tubes were placed there to prevent the tube sheets from being separated, and when pressure was in the boilers these braces were to be under tension, but experience has shown by their bending so constantly that they are under compression and act as struts to prevent the tube sheets from coming together.

As another proof of the high temperature in connection with these boilers, it may be mentioned that the furnace doorways, when originally fitted, had steel arches about  $\frac{3}{4}$  inch in thickness, to support the furnace lining at the front. These arches burned out so rapidly that it finally became necessary to make them entirely of fire brick, which change has resulted in far less trouble and in being in every way more satisfactory.

Congress has appropriated a portion of the sum necessary to construct new machinery and boilers for the "Chicago," which can be taken as a safe indication that what she now has will soon be replaced by more modern types

which, while they will drive her over 18 knots per hour, will also effect a saving of between 200 and 300 tons in weight. Triple expansion engines and coil boilers would probably result in 8000 horse-power and would also give her additional space below, a feature that would be heartily appreciated by various other departments than that of steam engineering.

### Electricity in Wire Mills.

Thomas Richardson, president of the Northeast Coast Institute of Engineers and Shipbuilders, delivered an address mainly devoted to the subject of "Electricity as a Power Transmitter." In the course of his address he said that an example of what may be termed ideal electrical driving is that of the Bedson Wire Company of Middlesborough, where the installation is the most perfect and complete that has as yet been attempted in England. Every process connected with the manufacture of wire is carried out by means of electricity, the wire drawing, galvanizing, spinning and barb fencing machines, overhead and locomotive cranes, hydraulic pumps, induced draft fans, lathes, centrifugal pump are all independently driven by electric motors. Owing to the entire absence of shafting and belting the construction of the building is very light, and the convenience of the whole plant is most noticeable. The current is generated by a 600 horse-power dynamo, driven direct by a three-crank triple condensing engine with boiler of 160 pounds pressure. A special tunnel, 350 yards in length, has been constructed for the conveyance of the conductors, and branches are taken from these to 50 motors, which vary from 5 to 40 horse-power each. The lighting of the works is most complete, the greater part being carried out on the inverted arc principle, which is so perfect that there is an entire absence of shadows. The original plans for driving these works electrically were prepared by Selby Bigge. Before definitely deciding to put down such a novel plant several experiments were necessary, for which purpose special machines were designed by Mr. Bedson, the managing director of the Bedson Wire Company. These experiments were made at Liège by H. Pieper, and were so successful that after an exhaustive series of tests the directors of the company decided to adopt the electrical installation in its entirety.

A novel feature in connection with the boilers at the Bedson works is the application of Ellis and Eaves' system of induced draft. This is the second application of the system to land boilers, the first having been made at the Atlas Works, Sheffield, originally arranged with Lancashire boilers. These have gradually been replaced by ten single ended boilers of the marine type, the advantages claimed being as follows: 1. Considerable economy compared with the Lancashire boilers with Galloway tubes. 2. Considerable reduction in space occupied. 3. Absence of smoke. 4. Greater elasticity of power. In ordinary work, by maintaining a vacuum of 3 inches at the fan, the combustion is at the rate of about 35 pounds per square foot of grate surface, and one single ended boiler can readily evaporate as much steam as three Lancashire boilers 27 x 7 feet, with ordinary chimney draft. Where the demand for steam varies in a works, the system is a great con-

venience, and this is especially the case for electric light installations. It is evident that with this system of draft, or with any other efficient system, the assumed consumption of 13 tons per day could be still further reduced.

## THE WEEK.

The *Monde Economique*, after careful investigation, estimates the world's coffee production for the current year at 12,000,000 bags. As against this output, larger than that of any previous year, there is a consumption of only 10,500,000 bags.

It is calculated that the operators of the Schuylkill Valley, Pa., coal region will put out at least 1,250,000 tons of anthracite coal during the month of November. Of this amount, about 1,000,000 tons will be marketed by the Philadelphia & Reading Coal & Iron Company.

The coinage executed at United States mints during the month of October aggregated 4,044,360 pieces, of the value of \$4,152,700; of which 264,360 pieces were gold, of the value of \$2,911,800; 2,150,000 silver pieces, of the value of \$1,217,000; and 1,630,000 pieces of minor coin, of the value of \$23,000. Of the silver coined, \$600,000 were standard silver dollars.

Ignatius Donnelly figures out from the last census returns that in 1890, 9 per cent. of the population of the United States owned 71 per cent. of all its wealth. One fifth of 1 per cent. of the people of this country owned \$12,000,000,000 of property, or about one-fifth of the whole property of the nation.

A new industry has been started in the San Joaquin Valley of California by Chicago tanners—namely, the cultivation of canaigre, a weed of the dock species containing a large amount of tannic acid. A large tract of land has been purchased on which the weed will be planted, and extensive works for preparing the acid will be built, at a cost of \$300,000. It is said that with the acid from this plant leather can be tanned better than by any other means.

Russell Sage is credited with the statement that the Manhattan Elevated Railroad Company have caused plans to be drawn for a double decked road to be operated by electricity in New York City. The scheme is said to have been submitted to prominent engineers of the United States and Europe and pronounced feasible. "The upper structure," said Mr. Sage, "could be constructed of light steel and used for express trains. The uprights could be placed by the side of those now in use, and would not disfigure the streets. The frame work could be very light, much lighter than the present structure, because by the substitution of electricity there would be no necessity to use heavy locomotives."

The *Canadian Lumberman* calls for measures to preserve the forests of the Dominion from the unnecessary destruction and waste that is now going on in them as well as for a system of replanting in places where trees have been cut down for lumber.

The *Railroad Gazette* gives a list of accidents occurring on the railroads of the United States in September, which shows that there were 146 accidents, in which 50 persons were killed and 126 injured. Of those killed 30 were rail-

road employees, 5 were passengers and 15 trespassers. Of those injured 84 were employees, 32 passengers and 10 trespassers.

October's fire losses in the United States and Canada, as compiled by the *Journal of Commerce*, amounted to \$8,186,700—an unusually low figure, and the smallest of any one month in the past three years, excepting that of September, 1892, which was just under \$8,000,000. The loss in October, 1893, was \$11,014,700, and that in October, 1892, \$13,350,000. The losses for the first ten months of 1894 are \$25,000,000 lighter than those for the first ten months of 1893. This marked diminution is hailed with satisfaction by the fire underwriters, as promising to aid in repairing the depleted surpluses of the insurance companies, after their disastrous experiences of last year.

### The France Grease Cup.

The Henry C. Ayer & Gleason Company, Betz Building, Philadelphia, are introducing the grease cup here shown

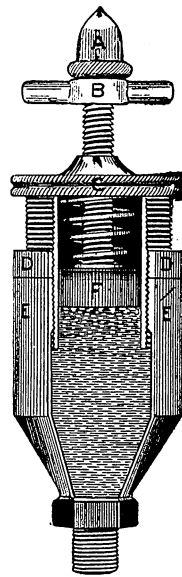


Fig. 1.—Cup in Operation.

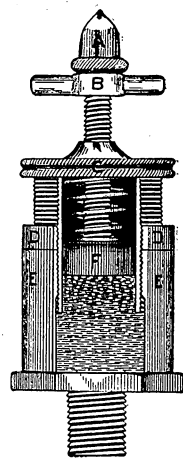


Fig. 2.—Locomotive Grease Cup.

### The France Grease Cup.

in two forms. The reservoir is formed by the cylinders E C, the latter being threaded to screw into the lower as may be required, and being held in place by the block nut D. The upper cylinder may thus be made to follow up the spring and maintain the same tension to the end of the stroke. The handle B is used to withdraw the spring for filling the cup, which may be operated entirely by hand.

It is announced that the Russian Government has decided on the establishment of two large locomotive works, one at Warsaw and one at Kharkoff, to construct the locomotives required for the Russian State railways, in order that they may be independent in this respect of Germany and Austria.

The Turkish Government has granted a concession for the opening up of a recently discovered deposit of manganese ore near Caradja, in the province of Aidin, Turkey. The deposit is said to have an area of 900 acres.

The Iron Age

New York, Thursday, November 8, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, - - EDITOR.  
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

Railroads Favor Foreign Tin Plate.

The manufacturers of tin plate are now traveling a thorny path. The cut in the duty on foreign tin plate was a very serious matter, involving a readjustment in the wages paid here, which is still a subject of dispute and may not be settled without a bitter fight involving the usual heavy losses to both employers and employed. It is not altogether clear in fact that the cut at first proposed will be heavy enough to answer the purpose intended, as wages are being lowered in the Welsh works, one of them having recently resumed operations with the severe reduction of 20 per cent. But the American manufacturers are further harried by the indefensible discrimination made against them by our railroads. For the past two years the freight rates to interior points on imported tin plates have been going lower and lower. But during the last six months these rates have been reduced 40 to 50 per cent. and in some cases as high as 60 and 70 per cent., for the benefit of the importer. This imposes a double burden on the manufacturer, who finds himself smitten in the house of those who should be his friends. The Western tin plate makers are more seriously affected by the discrimination in freight rates than those on the seaboard whose market is in their immediate vicinity. President W. B. Leeds of the American Tin Plate Company, at Elwood, Ind., has collated important data on this subject and has furnished the Western press with stirring communications which should have an effect on railroad managers. Mr. Leeds has himself been in the railroad service, resigning a high official position to establish the American Tin Plate Company, and it may therefore be presumed that he knows whereof he speaks. He makes the following comparison of existing freight rates per 100 pounds on American tin plates from Elwood, Ind., and Welsh tin plates from New York.

To	From Elwood.	From New York.
Buffalo.....	\$0.14	\$0.08
Cleveland.....	.11	.07
Toledo.....	.09½	.09
Columbus.....	.09	.09
Cincinnati.....	.08	.09
Louisville.....	.10	.10
Nashville.....	.33	.18
Memphis.....	.38	.16
Detroit.....	.10	.07
Indianapolis.....	.07	.08
Chicago.....	.09	.10
Peoria.....	.09½	.10
Milwaukee.....	.11	.10
St. Paul.....	.29	.26
East St. Louis.....	.11	.14
St. Louis.....	.11	.16
St. Joseph.....	.33	.24
Kansas City.....	.33	.25
Omaha.....	.33	.24

Leavenworth.....	.33	.27
Sioux City.....	.33	.24
Denver.....	1.08	.48

This is a startling statement. A slight analysis will show how the trade in foreign tin plates is favored. From Elwood to Indianapolis the distance is but 50 miles by rail and the freight rate is 7 cents on Elwood tin plates. From New York to Indianapolis the distance is 826 miles and the rate is but 8 cents on foreign tin plates. The long extra haul on the latter is thus practically annihilated, and the foreign tin plates are given almost even terms. Cleveland is much nearer to Elwood than to New York, but freight rates are arranged in inverse ratio to distance, as Elwood tin plates pay 11 cents and foreign tin plates but 7 cents. The same discrimination applies to trade with Detroit. Chicago is only 165 miles from Elwood, but 9 cents is charged for that short haul, while the imported tin plates are carried from New York, almost 1000 miles, for only 10 cents. It would seem to be bad enough to thus place imported tin plates in the Central Western States on such favorable terms, but the discrimination against domestic tin plates grows worse when Southern and far Western points are considered. Nashville and Memphis, for instance, can be reached much more easily by imported tin plates. The rate to Nashville is \$3 per ton lower than on Elwood tin plates, and to Memphis \$4.40 per ton lower, although Elwood is very much nearer than New York to these points. Foreign tin plates can be laid down at St. Paul and Minneapolis within 3 cents of the rate charged on Elwood tin plates. But the rates to Missouri River points and to Denver seem to have been arranged for the express purpose of driving domestic tin plates out of the market. Although Elwood is 800 miles nearer than New York, a much higher freight rate is imposed. The Denver rate is absolutely prohibitory to the domestic manufacturers. The American Tin Plate Company at one time had an excellent trade in Denver, but now they are absolutely unable to do any business there. Other tin plate manufacturers confirm these statements of freight discriminations, and are imploring the assistance of all American business interests in bringing about a different policy on the part of the railroads. Well may the domestic manufacturers make the charge that the railroads seem to be bent on destroying the domestic tin plate industry for the benefit of Welsh manufacturers.

When it is considered that the trade in foreign tin plates merely gives the railroads one way business, and that only on the finished product, they seem to be standing in their own light. The domestic tin plate industry supplies several tons of freight for every ton of finished product, and the larger the industry grows the more business will the railroads receive. But the managers of the roads directly interested in hauling materials to tin plate facto-

ries and merchandise to the people who are employed in them seem to be equally guilty of this discrimination with managers of other lines not so directly interested. Of these managers President Leeds well says: "They are now appearing before all the Railroad State Commissions and claiming that business handled at less than 1 cent per ton per mile would be an absolute loss, when at the rate of 10 cents per box from New York to Chicago (which is equal to \$2 per ton, 20 boxes making a ton) it shows a rate of 1/10 cent per ton per mile; and if they can haul freight at 1/10 cent per ton per mile for Welsh manufacturers it would look as though common justice, if not every legislative government; would force them to haul it for the American manufacturer at an equal rate."

Convict Labor on Roads.

The subject of the competition of prison made goods with those manufactured by free labor was lately referred to in these columns, and the evil effects of the practice of employing prison labor in a manner which in any way inflicts injury on the free workingman, either by reducing his wages to meet the competition of prison made goods or by narrowing the demand for labor in his special line, was commented on. How to employ the energies of convicts so that their labor may be made really useful to the State and at least cover the cost of their maintenance, while at the same time the product of their work shall not conflict with that of honest men outside of prison walls, is one that presents many perplexing features. Perhaps the most satisfactory solution of this question yet found is the employment of convicts in road making. This is an occupation that is not very much sought after by the ordinary laborer, while the condition of the average American country road presents a wide margin for improvement. The subject was recently discussed very thoroughly, after investigation by a committee, at a "good roads" convention in North Carolina, where the system of convict labor on the roads has been in operation for some little time. According to a report presented here the convict made roads in that State were examined and found to be as level and well surfaced as most town streets. The cost of labor per convict was 21 cents per day, including board, clothing, shelter, medical attendance and pay of guards. The actual cost of 50 convicts working 30 days on the roads was \$315; while at ordinary rates for free labor—not always easy to obtain—this work would have cost at least \$975. The convicts are also said to have performed 25 per cent. more work in the same time than the ordinary workingman of that section would have accomplished. It would seem that this method of utilizing the energies of criminals might with advantage be adopted more largely than is now the case.

### Tests of Automatic Fire Sprinkler Heads.

Prof. D. S. Jacobus of Stevens Institute of Technology presents a valuable paper on tests of automatic fire sprinkler heads in the last issue of the *Stevens Indicator*. Some ten years since the New York Board of Fire Underwriters submitted several automatic fire sprinkler heads to President Morton for comparative tests, and since that time all the sprinkler heads and their systems which have been considered by the board have been tested by Professor Jacobus. The present paper gives the results of these trials and describes not only the methods of testing, but also the principal characteristics which a reliable head should possess.

Fire extinguishing systems employing automatic sprinkler heads are of two kinds, the "dry pipe" and the "wet pipe." In the former there is no water in the pipes until the sprinkler head is released by the action of heat and thereby operates a valve admitting water to the piping. The object of this construction is to prevent freezing in the pipes leading to the heads. An important disadvantage of this system is that the water is longer in reaching the fire than in a wet pipe system. In some large plants the time required for the water to travel from the main valve to the head is from 1 to 5 minutes, according to the location of the head. In the wet pipe system the water flows upon the fire at the instant of the release of the head. The heads in the dry pipe system are generally placed in an upright position above the pipe in order that all water may be drained from the system. If they were placed in a pendant position a small quantity might be left in the head and cause trouble by freezing. In the other method the heads are usually placed in a pendant position, in which they are just as efficient as when placed upright, and the piping may be hung against the ceiling.

When sprinkler heads are subjected to long-continued use the following defects may be developed: The valve may stick in the seat after the fusible solder releasing device has fallen apart and released the valve; the releasing device may not fall apart after the fusible solder has melted so that the valve will not be released; the heads may open of their own accord. Sticking was first noticed when gutta percha washers were used, this material, in some cases, becoming so firmly cemented against the seat that the sprinkler would not open at ordinary pressures. Similar defects were found when a lead washer was used against a brass seat. The reliability of the head was increased when a copper disk was introduced between the lead washer and the valve face. Sticking at the valve seat must be especially guarded against, since, if a sprinkler on the top floor of a building is subjected to a pressure of, say, 8 pounds per square inch, the pressure on the

valve will be about  $1\frac{1}{2}$  pounds, as the nozzles of many sprinkler heads are about  $\frac{1}{2}$  inch in diameter. A small amount of corrosion will often be sufficient to overcome this low pressure.

The failure of the releasing device was developed in heads relying in a great measure on the elasticity of the brass frame, or other stiff brass pieces, to operate the releasing device. In some heads tested the force acting on the valve could be adjusted so that no leakage would occur at 40 pounds pressure per square inch, and yet this force would not be sufficient to operate the releasing device after the fusible solder had melted. A head of this kind operates perfectly when new, but not when it has been subjected to the strain for a long time. Opening without the application of heat has been found to be a most serious defect in several forms of heads.

The tests were made to ascertain the following: Reliability of action and sensitiveness; distribution and rate of flow in the open air and under flat and joisted ceilings; durability, in which the sprinklers are connected to short pipes which are filled with water. These tests are made in order to note if the releasing device will open of its own accord, and to determine if corrosion will cause the valve to stick. Professor Jacobus states that the main feature of a sprinkler head is that it shall operate with certainty in case of fire. To test this point the sprinklers are heated in an oven and the reliability of action noted at the same time that the sensitiveness is determined. Another test consists in applying a flame at intervals directly to the heads, in order to imitate the effect of a sudden fire where there are drafts of air. This is done with a gas burner that gives a large heating flame, completely enveloping the head. This test is stated to be a severe one, and sprinklers that will open correctly in an oven will sometimes fail when subjected to it. The main cause of failure in this case is the "starting" of the solder joint sufficiently to permit leaking in such a way as to cool the solder joint and prevent further opening.

The requirements of the New York Board of Fire Underwriters are that with 10 feet water head the distribution 8 feet below the sprinkler head shall be over a circle at least 10 feet in diameter, that the diameter 6 inches above shall be 8 feet or over when tested in the open air, and that the rate of flow shall be at least 1 cubic foot per minute. Sprinklers that distribute the water umbrella fashion, or in streams are not reliable. The best form of delivery is in large drops over the entire area, large drops being disturbed less than mist or spray, which a light draft may change the direction of. In the durability tests the sprinkler heads are mounted as in practice and their action noted at long intervals of time.

A few days since a foreigner visited a large works in Eastern Pennsylvania.

Impressive though the plant was for more than one reason, the most startling result of the visit came to him in one little incident. Among a number of important improvements under way was a powerful mill for rolling shapes. During the inspection one of the proprietors, who was acting as the host of the party, remarked that it was ten years within a month that the mill being displaced was completed. In 1884 the train, then new, was regarded as the greatest in the country, and was the pride not alone of the owners but of the trade at large. Ten years later the whole of the magnificent machinery—engine, train and all—had to wander into the scrap heap, because the works could not afford to be outstripped by others in modern plant. This is a recent and striking illustration of the destruction of capital invested in machinery by modern technical progress, and yet how many American manufacturers introduce as an item in their cost sheets a depreciation account which shall wipe out their plant investment in ten years?

### The Moral Effect of a Technical Education.

The technical school can scarcely be regarded as a teacher of morals pure and simple, but its influence for good is deep and lasting upon the integrity, sincerity and truthfulness of its students.

It is not in human nature to pursue a course of three or four years in such studies as mathematics and the sciences without absorbing some of the spirit of exactness and completeness which governs in every deduction, every theory and every law. The pupil is taught that certain causes must produce certain effects, that in nature there is no actual loss, no return without the requisite expenditure of force or of matter. Nature is perfectly honest, there is no trickery, no uncertainty; physical and chemical action must be in accord with nature's laws. We may or may not know them as yet, but there is system, certainly everywhere.

The absolute truthfulness of mathematics, the transformation of work into heat, and even the mysteries of light and electricity continually lead the student into paths of exactness and train him in accuracy of statement and action. His after life, as engineer, as chemist, as electrician, must of necessity be governed and controlled by the habits thus formed.

He feels that his reputation and character depend upon the accuracy of his statements regarding his work. He is chary about expressing opinions that have no substantial foundation. He becomes just in his judgment; it is second nature to him to look at both sides of a question, and he always desires to take an unprejudiced view of the case.

In point of fact he frequently becomes so candid and so impartial as to assure his failure as a salesman, and to his credit be it said that he very sel-



dom possesses the qualifications necessary to success where negotiations must be carried on with "boodle aldermen" and stubborn committeemen who yield only to the persuasiveness of the almighty dollar; upon them words of reason and logical argument are worse than wasted.

That the above is a faithful pen picture of all technical graduates can hardly be claimed, but that the influence of his studies may be seen in the later life of any man, and that, other things being equal, he is more sincere, more honest and more just than he would have been had he not pursued a technical course, cannot be questioned.

#### Chicago Prices for Tank Steel.

We have been permitted to copy the following table showing the course of prices paid during the past four years for tank steel by a leading Western railroad company, per pound, f.o.b. cars, Chicago:

Months.	1891. Cents.	1892. Cents.	1893. Cents.	1894. Cents.
January.....	2.50	2.20	2.00	1.55
March.....	2.45	2.20	1.90	1.37½
May.....	2.40	2.10	1.85	1.30
July.....	2.30	2.05	1.75	1.40
September...	2.30	2.05	1.75	1.40
November...	2.20	2.00	1.70	...

This table shows that during the entire period covered the decline in prices was almost unbroken, the first symptom of a check appearing in July of the present year. Low water mark was touched in May, but, as is well known, the coke strike then prevailing caused an advance in Bessemer pig iron and steel billets, which, of course, compelled an advance in tank steel. The higher rate ruling since that time was not due to an improvement in general business. It may be idle to speculate on this phase of the subject, but the question will suggest itself, How low would prices have gone if the coke strike had not occurred?

#### OBITUARY.

B. O. DANA.

B. O. Dana, president of the Dana Hardware Company, Boston, died at his residence in that city on the 31st ult., after a six months' illness with a complication of diseases. Mr. Dana was the son of O. D. Dana, and upon the death of the latter about a year and a half ago succeeded him as president of the well-known company which bears their name. The deceased was 34 years of age and leaves a wife and child, a boy of eight years. Mr. Dana was a member of St. Paul's Lodge, Royal Arch Chapter and St. Omar Commandry of Masons; also of the South Boston Yacht Club. The funeral was held on the 4th inst.

The aggregate length of telegraph lines in existence throughout the world is computed at 1,069,123 miles. The total is made up as follows: Europe, 382,987 miles; Asia, 67,875 miles; Africa, 21,687 miles; and Australasia, 47,812 miles. This leaves 548,822 miles for America.

## CORRESPONDENCE.

### The Validity of a Note Dated on Sunday.

*To the Editor:* The law says "A note made on Sunday is void."

"A" wishes to settle a transaction which expires on October 28 (Sunday) by having paper discounted. He on Wednesday prior to above makes out his paper and proposes to offer it for discount first discount day, which is succeeding Friday.

"B" contends that the note, which is dated 28th, to even up transaction, is worthless on account of date being Sunday.

"A" contends that the spirit of the law is to prevent Sunday labor and that the dating of the note as above does not violate the law, the work not being done on Sunday and the evidence (communication offering for discount) being proof of work being done on a secular day.

Which is right? Yours,  
PIG IRON.

"A" is right. The note is valid and can be enforced even though it is dated on Sunday, provided it is not delivered or transferred or discounted on that day. We believe the law to be uniform on this point in all the States and have been unable to find any decision to the contrary.

It is somewhat extraordinary that contracts made or labor done on Sunday were not unlawful at common law. The statute of 27 Charles II in 1672 contains the first prohibition. And so in the various States whether an act is unlawful or not if done on Sunday depends not on the general rules of the common law, but on the precise language of the particular statute, and these statutes vary very materially. The object of the statute is to prevent labor on the Sabbath, and particularly manual labor. It is a provision for the benefit of workmen and was not intended to disturb or impair the validity of contracts and for this reason the courts construe the statute very narrowly. The tendency is to hold contracts made on Sunday to be valid if there is a possible loop hole in the language of the act.

In Massachusetts, for instance, it was recently held that "a note dated on Sunday, but made and delivered on a secular day, is binding." *Stacy vs. Kemp*, 97 Mass. Law Report, page 166. The Illinois courts have decided the same way. Indiana goes still further. The courts there hold in the face of the statute that "a deed, though signed and acknowledged on Sunday, is valid if delivered on another day." Of course, the same rule applies with equal force to a note. In Pennsylvania it is held by the courts that the mere signing of any instrument on Sunday will not make it void, if it is not to take effect until delivery. Even in Vermont it was held that a contract for work to be done which was partly made on Sunday was valid because it was not made legally complete till Monday.

But the courts of New York go much further than those of the other States. An agreement or contract compromising a suit and made on Sunday has been held valid by the Court of Appeals. In another case a private sale of property on Sunday was held to be an enforceable contract because the statute says no one shall "expose" goods for sale, and where the sale was private—between two parties—the statute does not prohibit. This is a very recent de-

cision of the Court of Appeals. Contracts of advertising in Sunday papers are held valid. This is probably so, however, because the statute in its terms permits such work to be done on Sunday. The Western States, as a rule, follow the decisions of New York in this matter and as we have said the constant tendency is to allow contracts to be legally made on Sunday, provided such contracts do not call for actual physical labor on that day.

### Hydraulic Forging.

*To the Editor:* I have, in the first place, to thank you for the compliment you have paid me in allotting so much of the valuable space in your issue of September 6 to my paper on "Hydraulic Forging." I see, in your issue of September 20, a letter from W. H. Wood, who sent me copy of this, but after he had sent it to you. My reply to him will, however, answer his letter to you, and was as follows:

"MEDIA, DEL. CO., LA., U. S. A., }  
October 6, 1894.

W. H. WOOD, Esq., Engineer:

"DEAR SIR—I am in receipt of yours of 19th September. I have not seen the article in *The Iron Age*, so do not know what it contains, but in the original paper, with discussion, of which I have sent you a copy, you will find that in the discussion I. A. Aspinall referred to the matter, and goes even one better than the invention of your father. My authority for giving Sir Joseph Whitworth the credit is that of Professor Greenwood and from general report.

"It is of course quite possible that Sir Joseph's thoughts may have been directed into the particular channel, as you say, but I do not think your father, who undoubtedly was an able man, is alone in having his ideas appropriated without acknowledgment by others.

"Thanking you for your courtesy, I remain, yours very truly,  
(Signed) "RALPH TWEDDELL."

The man who anticipated Mr. Wood's father was called "Hollenrahe;" he took out one patent so far back as 1818 and a second in 1819, and not only took out the patents but actually applied pressure to copper ingots and talked of using hydro-mechanical power for the purpose. In my paper I find I say:

"It is of course not difficult, and to some minds a congenial task, to hunt for and find something in the records of the Patent Office which may appear to anticipate the results obtained by any one who successfully introduces a new system."

Had Mr. Wood not himself opened up the question, I should not have thought it worth while to go into the matter, but I see no reason to deprive Sir Joseph Whitworth of the credit due to him for his application of fluid pressure to steel; he it was who risked an enormous capital, and after all it is quite possible that he had the whole thing in his mind when the conversation with Mr. Wood took place.

RALPH HART TWEDDELL.  
WESTMINSTER, October 22, 1894.

A mechanical device has recently been introduced into the 28-inch mill at the Homestead Steel Works, Homestead, Pa., which places the ingots in the heating furnaces and withdraws them. The introduction of this device has done away with the services of quite a number of skilled men.



## PERSONAL.

At the annual meeting in December of the American Society of Mechanical Engineers the following ballot will be voted upon: For president, E. F. C. Davis, Richmond, Va.; for treasurer, Wm. H. Wiley, New York; for vice-presidents, F. H. Ball, New York; Jesse M. Smith, Detroit, and M. L. Holman, St. Louis, and for managers, John C. Kafer, New York; Chas. A. Bauer, Springfield, Ohio, and Arthur C. Walworth, Boston.

Hudson Maxim, chief engineer and manager of the Maxim Powder & Torpedo Company of New York, met with a serious accident last week at Maxim, N. J., the explosion of a disk of fulminate compound shattering his left hand. Mr. Maxim, who is a brother of Hiram Maxim, the inventor of the Maxim gun, is himself a well-known inventor, and the compound which caused the accident is a material recently invented and patented by him for setting off high explosives.

The Crescent Steel Company's Chicago branch loses the services of Albert L. Butler, who has been manager for 20 years, but is obliged to resign on account of his health. The company have appointed as his successor H. H. Miner, one of Mr. Butler's assistants for many years. The trade will hear of Mr. Butler's retirement with much regret.

## San Francisco News.

SAN FRANCISCO, October 29, 1894.

There is an important movement now in embryo here which, if successful, may have lasting and far reaching consequences. One of the smartest business men of the day is the gentleman whose name is at the head of the Union Iron Works and who may be regarded as the father of iron and steel shipbuilding on this coast. He has succeeded where many other men would have failed and has overcome almost insuperable obstacles. He has laid the foundation of a vast industry on this coast, but that industry may be said to be still in its infancy. One of the great obstacles in the way of that industry here is the heavy taxation for local and State purposes. It is proposed, or rather it will be proposed at the next meeting of the State Legislature, that for all vessels built in the State of California the port of San Francisco shall be a free port. Should this proposal be made a law it will lift a great burden from shipping belonging to the port of the State and built anywhere within its borders. It would help to reduce the cost and narrow considerably the margin between the cost of building here and at the shipyards of the East or on the Clyde. Vessels owned here have to pay these taxes every year, and making all due allowance for the fact that they are not assessed at the full value as shown by the cost of construction, still it is evident that in, say, 20 years a very great proportion of the latter would be made. In this way the difference now subsisting against San Francisco as to cost of construction would be nearly, if not altogether, offset and this city would become the center of one of the greatest shipbuilding industries in America. In fact, it is certain that it would become the great iron and steel shipbuilding center of the Pacific, and it is not without the limits of probability that China

and Japan would come here to have their men-of-war and commercial vessels built. And we may add that were any large proportion of the vessels trading to and from the port of San Francisco built here it would make the city so much richer by the freight money that would remain here. The movement for free shipping is, however, only a part of a whole where the Legislature is to be called upon to favor California manufactures in the matter of taxation. There is to be a concerted movement in this matter and a convention will probably be held in this city to take steps to influence the Legislature in this regard. It is more than likely that the new Legislature will regard with favor whatever the recommendations of such a body would be.

The general conditions of business are favorable, considering the season of the year and the fact that we are recovering after a very bad dose of bad times. The sale and shipment of wheat, albeit at very low prices, is going on in great volume just at present, while the shipment of fruit by rail is larger than ever known in our history. The result is that a great deal of money is being distributed among producers and that they are making a good many improvements. Trade is, therefore, stirring where a couple of months since it was almost at a complete standstill. The hardware and iron trades get their full share of the benefits resulting from the improved order of things and sales by jobbers in these and kindred lines have of late improved quite considerably. It is likely that this improvement will continue for some little time, say for a month or so longer, when the business of the year usually comes to an end. This refers more particularly to bar iron and steel and hardware. There is some demand still for plows, cultivators and other seasonable articles and there are moderate receipts of them. There is also a fair demand for our home production of such goods. As regards our import trade by rail it spruced up a bit during the past week or so, receipts being much heavier than for a long time past. The leading factor during the time noted has been bar iron, though iron pipe still cuts quite a respectable figure. There have been some importations of pig iron too, but not of any great volume. The importation of nails by rail has, however, been somewhat larger than usual during the past month and there has been a better demand for them too. Here the price has not varied at all from that which I sent you some time ago—\$1.50 as a base for iron and steel. The last clipper arriving here brought a good deal of hardware, &c., of various kinds, but we do not seem on the whole to be receiving much that way. Our imports of pig tin have been very light for some time. The last steamer from Sydney brought none, and, indeed, as the canning season is about over and as people are in no hurry to buy for the next season, that is scarcely to be wondered at.

An association under the name of the Monterey Mineral Railway & Terminal Company has been organized in Baltimore, and chartered under the laws of the State of West Virginia, with the object of enlarging the trade of Baltimore with Mexico, and to help develop the resources of the Southern republic. Wm. Johnston of Liverpool, England, president of the Johnston line of steamships, was chosen president of the new corporation; Charles K. Lord, third

vice-president of the Baltimore & Ohio Railroad, vice-president, and John Gill secretary-treasurer. The principal office of the company will be in Monterey, while its chief office in the United States will be located in Baltimore. The company propose among other things to acquire terminal properties in Baltimore and certain Mexican ports, and to secure lands in Mexico that contain silver and other ores, to build smelters and to ship the refined product to the United States. A service of steam vessels, a railroad, wharves, piers, warehouses, and other adjuncts of trade will be built and owned by the corporation, who propose to obtain concessions from the Mexican Government to further the extension of trade between the two countries.

In a large number of manufacturing concerns in Massachusetts, the affairs of which are covered by the latest report of the State Bureau of Labor Statistics, "there were 43,803 partners or stockholders in 1893, against 42,735 in 1892. The number of males included in the total for the latter year was greater, however, than that which was covered by the larger figures for 1893. There were 27,325 male partners or stockholders in 1892 and 27,211 in 1893. On the other hand, the number of women who had an interest in the manufacturing concerns dealt with by the report was 16,592 in 1893, against 15,410 in the year preceding. The partners or stockholders were 63.94 per cent. males in 1892 and 27.56 per cent. females. In 1893 the proportions were 28.38 per cent. females and 62.12 per cent. males.

United States Labor Commissioner Carroll D. Wright has lately presented some interesting figures showing the changes that have taken place in the wages of labor in the past half century, which exhibit a remarkable improvement in the condition of the wage earner during that period. He shows that wages were much higher and the cost of living materially lower in 1892 than they were 50 years before. Thus laborers in a New York brewery received 62½ cents a day in 1840, 84 cents a day in 1860, \$1.30 a day in 1866, and from \$1.50 to \$2 a day in 1891. Carpenters earned from \$1.25 to \$1.62 per day of ten hours in 1840, about the same in 1860, and from \$3 to \$3.25 per day of eight hours in 1891. Wheelwrights received \$1.25 per day in 1840, the same in 1860, \$2 in 1866, and \$2.50 in 1891. Cotton weavers were paid 62 cents per day in 1840, only 54½ cents in 1860, 85 cents to 90 cents in 1866, and \$1.05 in 1891. Wool spinners received something under \$1 per day in 1840, \$1.05 in 1860, \$1.80 in 1866, and \$1.38 to \$1.75 in 1891.

The Marinette Iron Works Company of Duluth, Minn., are manufacturing a new pump invented by L. D. Libbey for pumping mud, sand and gravel. It is stated that a thorough test showed a pumping capacity of 200 cubic yards of sand and gravel per hour. In this pump blades are placed which are made on the same principle as a propeller's screw, and it is claimed that they will be very durable.

Western glass factories are greatly interested in the recent discovery of a large deposit of suitable sand near Anderson, Ind. It is a material of which they have been greatly in need, being obliged to transport it from distant localities.

An Increase in Pig Production.

Production has increased further until now in the Central West the make is close to the maximum attainable. The improvements made in the equipment at a number of the furnaces during the idleness caused by the coke strikes is telling in the make of a number of stacks.

On November 1 the active furnace plant, grouped according to fuel used, possessed the following weekly capacity:

Fuel.	No.	Capacity per week.
Anthracite.....	36	18,600
Coke.....	123	135,572
Charcoal.....	22	4,694

Totals November 1.....	181	158,866
Totals October 1.....	172	151,135

Increase or decrease..... + 9 + 7,731

The weekly product of all the furnaces on November 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
November 1, 1894.....	181	158,866
October 1.....	172	151,135
September 1.....	171	151,113
August 1.....	135	115,356
July 1.....	107	85,950
June 1.....	88	62,517
May 1.....	127	110,210
April 1.....	144	126,732
March 1.....	133	110,164
February 1.....	125	99,242
January 1.....	130	99,087
December 1, 1893.....	130	99,379
November 1.....	117	80,070
October 1.....	114	73,895
September 1.....	125	82,434
August 1.....	169	107,042
July 1.....	220	153,762
June 1.....	244	174,029
May 1.....	251	181,551
April 1.....	255	178,858
March 1.....	255	176,978
February 1.....	251	171,201
January 1.....	246	173,068
December 1, 1892.....	246	176,271
November 1.....	244	171,082

The status of the coke furnaces was as follows:

Coke Furnaces, November 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	5	2	2,764	3	3,300
Pennsylvania:					
Pittsburgh District.....	25	23	37,737	2	1,560
Spiegel.....	2	2	1,838	0	0
Shenango Val. Juniata and Conemaugh Valley.....	17	14	16,153	3	1,550
Spiegel.....	14	5	6,132	9	3,526
Younghigheny Valley.....	1	1	686	0	0
Miscellaneous.....	3	1	900	2	1,405
Maryland.....	4	2	1,434	2	1,250
Wheeling District.....	5	0	0	5	6,000
Ohio:					
Mahoning Val. Central and Northern.....	8	6	4,274	2	2,400
Hocking Val. Hanging Rock.....	14	9	11,068	5	3,700
Indiana.....	10	7	6,491	3	1,938
Illinois.....	12	0	0	12	3,151
Minnesota.....	13	7	1,525	6	2,091
Wisconsin.....	2	0	0	2	412
Missouri.....	19	9	15,188	10	4,200
Colorado.....	1	0	0	1	629
The South:					
Virginia.....	5	1	1,214	4	2,938
Kentucky.....	6	0	0	6	3,572
Alabama.....	3	2	2,091	1	600
Tennessee.....	22	10	6,148	12	7,385
Georgia.....	6	2	720	4	3,118
N. Carolina.....	38	13	19,834	25	10,150
Totals.....	14	6	4,680	8	3,150
	2	1	590	1	600
	1	0	0	1	97
Totals.....	252	123	135,572	129	73,942

As compared with previous months the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
November 1, 1894.....	123	135,572
October 1.....	119	129,981
September 1.....	112	125,879
August 1.....	79	94,707
July 1.....	53	68,878
June 1.....	40	47,104
May 1.....	75	85,580
April 1.....	92	105,011
March 1.....	83	89,794
February 1.....	80	81,970
January 1.....	80	81,907
December 1, 1893.....	72	78,241
November 1.....	57	58,820
October 1.....	52	53,061
September 1.....	54	56,876
August 1.....	84	77,907
July 1.....	122	117,072
June 1.....	140	132,079
May 1.....	146	139,788
April 1.....	145	135,488
March 1.....	145	133,579
February 1.....	140	129,396
January 1.....	138	131,731

There have been relatively few changes among the coke furnaces. Rebecca and and Stewart in the Shenango Valley are running. Seneca in Ohio has started and Belfont and Hamilton in the Hanging Rock region are again at work.

The position of the charcoal furnaces was as follows:

Charcoal Furnaces, November 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	13	3	220	10	820
New York.....	5	1	105	4	440
Pennsylvania.....	13	1	42	12	870
Maryland.....	6	0	0	6	418
Virginia.....	13	0	0	13	827
Ohio.....	9	3	172	6	477
Kentucky.....	3	0	0	3	290
Tennessee.....	9	1	100	8	991
Georgia.....	3	1	263	2	230
Alabama.....	13	3	561	10	2,735
Michigan.....	20	5	1,654	15	4,194
Missouri.....	1	1	293	0	0
Wisconsin.....	5	2	1,159	3	830
Texas.....	4	1	125	3	470
Washington.....	1	0	0	1	100
Oregon.....	1	0	0	1	200
Totals.....	119	22	4,694	97	13,852

As compared with previous months the record of active charcoal furnaces stands as follows:

	Furnaces in blast.	Capacity per week.
November 1, 1894.....	22	4,694
October 1.....	22	4,889
September 1.....	23	5,099
August 1.....	20	3,463
July 1.....	22	3,806
June 1.....	18	3,274
May 1.....	17	4,023
April 1.....	18	3,982
March 1.....	18	3,754
February 1.....	18	3,645
January 1.....	21	4,099
December 1, 1893.....	26	4,950
November 1.....	26	5,084
October 1.....	28	5,496
September 1.....	28	5,700
August 1.....	34	5,563
July 1.....	35	7,222
June 1.....	34	8,034
May 1.....	38	8,595
April 1.....	38	8,729
March 1.....	36	8,623
February 1.....	37	8,934
January 1.....	38	8,865

There has been an increase in production in the Salisbury district. Pine Grove in Pennsylvania expects to blow in soon. In Michigan Gaylord stopped work. An extraordinary record has been made by Hinkle in Wisconsin, which produced 3574 tons of charcoal pig in October, an average of 807 tons per week. In Alabama Round Mountain Furnace is soon to blow out.

The status of the anthracite furnaces was as follows:

Anthracite Furnaces, November 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	14	2	1,280	12	5,173
New Jersey.....	10	2	974	8	3,879
Spiegel.....	3	3	253	0	0
Pennsylvania:					
Lehigh Valley.....	39	11	4,976	28	11,010
Spiegel.....	1	0	0	1	65
Schuylkill Valley.....	27	6	3,837	21	8,919
U. S. Susquehanna Valley.....	15	2	1,435	13	4,511
L. Susquehanna Valley.....	14	3	2,200	11	4,025
Lebanon Valley.....	13	7	3,645	6	3,297
Totals.....	136	36	18,600	100	40,679

For a number of months past our records of active anthracite furnaces show the following:

	Furnaces in blast.	Capacity per week.
November 1, 1894.....	36	18,600
October 1.....	31	16,265
September 1.....	26	19,135
August 1.....	36	17,186
July 1.....	32	13,266
June 1.....	30	12,139
May 1.....	35	17,607
April 1.....	34	17,739
March 1.....	32	16,618
February 1.....	27	13,627
January 1.....	29	13,081
December 1, 1893.....	32	16,188
November 1.....	34	16,166
October 1.....	34	15,338
September 1.....	43	20,758
August 1.....	51	23,572
July 1.....	63	29,268
June 1.....	70	33,910
May 1.....	67	33,168
April 1.....	72	34,641
March 1.....	74	34,773
February 1.....	74	32,871
January 1.....	70	32,772

An interesting event of the month was the blowing in of what is practically a new modern furnace at Poughkeepsie, thus showing an encouraging sign of vitality in the Hudson River district. In the Schuylkill Valley one Keystone stopped and one Swede and Temple started. In the Lehigh Valley the Bethlehem Iron Company have an additional furnace going.

Stocks.

The position of stocks, sold and unsold, as reported to us November 1, was as follows, the same furnaces being represented as in former months:

Stocks.	Sept. 1. Tons.	Oct. 1. Tons.	Nov. 1. Tons.
Anthracite pig.....	116,693	105,287	96,857
Coke pig.....	197,877	197,427	196,112
Charcoal pig.....	217,554	221,998	219,351
Totals.....	532,264	524,712	512,320

Although our figures do not include the quantities held by the large steel companies East and West, they serve to indicate pretty accurately that a slight reduction in stocks took place during October.

Happily gold exports have ceased *pro tem*. Although the condition of foreign exchange at the close of last week would have justified the shipment of gold, none of the precious metal was sent out, and since that time the exchange market has become easier in tone. The offerings, especially of grain bills, early in the week were large and sufficient to meet all the demands from remitters. The future course of the market in relation to gold shipments will depend entirely on the foreign demand for securities and the supply of commercial bills.

## MANUFACTURING.

### Iron and Steel.

For two or three years past the Carnegie Steel Company, Limited, of Pittsburgh have had under consideration the question of the erection of blast furnaces at Duquesne, Pa., to supply the Duquesne Steel Works with pig metal. As it is now the pig used at this plant is made at Bessemer, Pa., and is then taken across the Monongahela River to Duquesne, the cost being estimated at close to 25 cents per ton. About a year ago the scheme of taking hot metal from Bessemer to Duquesne was tried at considerable cost, but was abandoned as impracticable. Recently the concern have secured additional ground at Duquesne and plans have been drawn for the erection of four furnaces at Duquesne, work on which will probably be commenced early in 1895. The furnaces will be largely modeled after furnaces H and I, at Bessemer, and will have a capacity of turning out from 350 to 400 tons each of pig iron every 24 hours. The further announcement is made that Thomas Rothhoff has been engaged to superintend the construction of the new furnaces. Mr. Rothhoff was formerly superintendent of the blast furnaces of the Carrie Furnace Company of Pittsburgh, but recently severed his connection with that concern. Since the installation of the large new blooming mill at the Duquesne Steel Works early in the year some phenomenal records for output have been made. As high as 1800 tons of billets have been turned out in 24 hours, and the average daily production right along is close to 1500 tons. The blooming mill in question was built by Mackintosh, Hemphill & Co. of Pittsburgh.

From reliable sources comes the information that the plant of the Keystone Bridge Works of the Carnegie interest, at Pittsburgh, will be removed to Homestead, Pa., during the coming year. Plans for the new buildings have been completed for some time and are now in the hands of the chief draftsman at the Homestead Steel Works. The buildings are to be erected on the ground now occupied by the red tenement houses and the race track. The capacity of the new plant for turning out bridge material will be much in excess of that of the present works in Pittsburgh.

The best previous record for production of rails at the Edgar Thomson Steel Works, Bessemer, Pa., was surpassed during the month of October, the production reaching 35,900 tons. In one 12-hour turn 1800 tons were turned out and on the other turn 1790 tons. The best previous record for production in any one month at this plant was about 33,000 tons.

C. W. Bray, formerly mechanical engineer for the Lloyd Booth Company, Youngstown, Ohio, has accepted the presidency of a new company organized at New Lisbon, Ohio, and who will erect a tin plate plant at that place. The main building will be 100 x 200 feet, and all the buildings will be of iron. The contract for their erection has been given to the Youngstown Bridge Company of Youngstown, Ohio.

The plant of the Greensburg Steel Company, Greensburg, Pa., which has been idle for several years, and is at present owned by J. C. Jamison of Pittsburgh, will probably be put in operation in a short time. A new crucible furnace of 12 pots has recently been added to the plant.

The Ironton Structural Steel Company of Duluth, Minn., are running their new mill on 12-inch beams for stock. Some time this month they expect to have their large mill in operation, rolling 36-inch beams. These mills have been built under patents of James E. York.

The plant of the Latrobe Steel Works, Latrobe, Ohio, manufacturers of locomotive tires, is in full operation on double turn in all departments.

The Elliott Steel Company, New Castle, Pa., manufacturers of fine cold rolled steel and hot rolled steel, have been dissolved and have been succeeded by a new concern known as the Elliott-Washington Steel Company, who will continue the manufacture of fine rolled strip steel, suitable for parts of sewing machines, bicycles, typewriters and other articles of manufacture in which rolled steel is used. This firm are making a specialty of the manufacture of what is termed "dead soft" cold rolled steel by their own process, for which they claim many points of superiority. The Elliott-Washington Steel Company are com-

posed of Geo. Elliott, W. L. Washington, Noah W. Elliott and Thomas C. Elliott.

The Hartman Mfg. Company of Ellwood City, Pa., are building an additional factory 50 x 100 feet in size, which is expected to be completed and ready for occupancy by December 1 next.

The Ellwood Shafting & Tube Company, Ellwood City, Pa., are erecting a steel building 80 x 80 feet; and otherwise considerably increasing their capacity for the manufacture of seamless tubing, which is known to the trade as Hartman seamless tubing. With the new addition to this plant the floor space will cover almost 1½ acres.

The Edith Furnace of the Hainesworth Steel Company, Allegheny, Pa., under the management of John Reis, made during the month of October, just closed, 7744 gross tons of Bessemer iron. The largest record for one week was 1800 tons and for one day 282 tons. This excellent record was made on a mixture of two-thirds Mesaba ore, using less than 1 ton of coke to 1 ton of iron.

The Cleveland Rolling Mill Company of Cleveland, Ohio, recently produced over 79,000 cut hoops, 1½ inches wide and No. 18 gauge, in 11 hours, and expect to add such improvements in the near future as to double the capacity. James Ring, formerly with the Union Iron & Steel Company of Youngstown, Ohio, has charge of this mill.

Pine Grove Furnace of the South Mountain Mining & Iron Company, in Cumberland County, Pa., is undergoing repairs, preparatory to blowing in in about two weeks.

The furnace at Round Mountain, Ala., will go out of blast in a few days.

At Lake View, Wis., the work of building the new rolling mill is going rapidly forward. The frame is up and the foundations for the machinery laid. The mill will be ready for operation, it is thought, by March 1 next.

The final arrangements for locating the Newark Machine Works, at Newark, Ohio, have been made, and the work of erecting the plant will be pushed forward as rapidly as possible.

The blast furnace of the Spring Lake Iron Company, at Fruitport, Mich., is about ready to resume operations.

W. P. Worth & Bro. of Coatesville, Pa., will, it is stated, erect new tube works providing the proper concessions are granted by the borough officials.

An error, which probably grew out of the similarity of names, was made in these columns last week, in using the name of the Colorado Fuel & Iron Company instead of that of the Colorado Coal & Iron Development Company. It is the latter company, and not the Colorado Fuel & Iron Company, who have issued a circular and a plan providing for the payment of accruing interest, &c. These are two separate and distinct companies, the Colorado Fuel & Iron Company operating blast furnaces and steel works at Pueblo, and the Colorado Coal & Iron Development Company being chiefly interested in real estate in and adjoining Pueblo.

### Machinery.

The Edward P. Allis Company of Milwaukee have secured contracts for four 1000 horse-power engines for the Metropolitan Elevated Railway Company of Chicago, to be used in operating their electric equipment.

The Phoenix Mfg. Company of Eau Claire, Wis., have broken ground for new machine shops, to be 45 x 180 feet in size, built of stone and arranged with traveling cranes and heavy machinery. The company's contract stipulates that all workmen shall be residents of Eau Claire.

The machine shop and round house of the Baltimore & Ohio Railroad, at Bellaire, Ohio, were destroyed by fire last week. The loss is estimated at \$10,000.

The Hudnut Foundry & Machine Works of Big Rapids, Mich., and the Ivens Mfg. Company of New Orleans are reported to have arranged for the removal of their machinery to Meridian, Miss., where their interests will be consolidated as the Interstate Iron Works Company.

The Philadelphia Engineering Works of Philadelphia have just completed contracts with the Carnegie Gas Company, Pittsburgh, for three 30 x 60 inch gas compressors. Each is driven by a 32 x 60 inch Philadelphia Corliss engine of their rolling mill type. They have also con-

tracted with the Pittsburgh Natural Gas Company of Pittsburgh for a pair of 30 x 60 gas compressors, each driven by a 24 x 60 inch Philadelphia Corliss engine. Also a pair of 30 x 60 inch gas compressors for the Ohio Valley Gas Company, each driven by a 26 x 60 inch Philadelphia Corliss engine. They have also just contracted with Marshall Bros. of Philadelphia for an 800-horse-power tandem compound condensing engine of their rolling mill Corliss type to drive their tin plate mills. They are just shipping for the Chamberlain Coal Company of Pottsville, Pa., two 32 x 60 inch Philadelphia Corliss hoisting engines complete with drums, brakes, &c., and two 14 x 36 heavy Corliss engines for the same company to be used for their coal breaker. They are delivering to the Standard Steel Works, Burnham, Pa., a 15-ton revolving open hearth steel furnace, together with gas producers, piping and chimneys.

The Lodge & Davis Machine Tool Company of Cincinnati, Ohio, have just issued a circular illustrating and describing their full line of universal and plain milling machines.

The efficiency and economy of the Buffalo forced draft system is attested to by W. F. Sauber, engineer of the steamer "Wm. H. Gratwick No. 2," who states that the system as installed in that vessel is a complete success. A saving of more than 10 per cent. in better combustion was found in the forced draft than in natural draft. A car of slack coal was tried on a recent trip, when the engine was worked for two and a half hours full speed, and more steam was generated than was necessary for use.

In *The Iron Age* of October 25 was presented an illustrated description of the Union reversible face plate jaw made by the Union Mfg. Company. In that article we gave the factory address of the company as New Haven, when it should have been New Britain, Conn. The warehouse address, 103 Chambers street, New York, was correct.

The new boiler shop of the Aultman-Taylor Company, at Mansfield, Ohio, will be 300 x 100 feet in size. It is stated that electricity will largely supersede steam in the operation of the machinery.

The Frank-Kneeland Machine Company, Pittsburgh, manufacturers of iron and steel works machinery, have the tin plate plant for Goldsmith, Lowenberg & Co. of New Kensington, Pa., nearly ready for shipment. It includes all the machinery for a four-mill plant. The Frank-Kneeland Machine Company have just added a third Shaw electric traveling crane of 20 tons capacity to their equipment, and have also made other additions to their machinery, which will materially increase the capacity of their plant.

### Hardware.

J. Renek's Sons' rope and twine factory, at Easton, Pa., which has been idle since last May, has resumed operations with a force of about 100 hands.

The shoe knife manufactory of Matthew George, at Mansfield, Mass., was burned on the 29th ult. Loss \$4000; partly insured.

Clark Bros. & Co., Southington, Conn., have decided to erect an addition to their plant which will be used as warehouse and office. The building will be about 80 feet long and 30 feet wide, and will consist of two stories and basement.

The Turner Mfg. Company, Brooklyn, N. Y., have been organized for the manufacture of hardware specialties. The capital stock is \$45,000.

The Hubbell Sulky Harrow Company of Milwaukee, Wis., have been incorporated, with a capital stock of \$125,000.

The organization of the Universal Fastener Company of Chicago, Ill., is announced. The company's capital is \$300,000. The incorporators are Whitcomb L. Judson, William D. McIlvaine and Thorne D. Earle.

F. E. Myers & Bro., Ashland, Ohio, have just completed a brick addition to their already extensive factory. The new building is 50 x 175 feet and three stories high. It will be completely equipped with the best machinery on the market. This new building, with other improvements in their plant, will increase their capacity about one-third.

The Hansen-Huenekens Cycle Company of Madison, Wis., have filed an amendment to their articles of incorporation, changing the style of the company to the Huenekens Cycle Company.

Penn Hardware Company, Reading, Pa., are working five days a week, nine hours a day, with a force of 500 employees. They state that their business in the finest grades of hardware has improved considerably during the past year. They also state that they have commenced manufacturing a full line of cylinder lock work.

Stover Mfg. Company, Freeport, Ill., advise us that they are having an excellent trade in wind mills and grinding mills. Sales of these goods are larger than the company have heretofore known.

#### Miscellaneous.

The power station for the Nassau Electric Railway Company, at Brooklyn, N. Y., will be 102 feet wide and 150 feet long, and will be constructed entirely of iron and steel, the whole designed and built by the Berlin Iron Bridge Company, East Berlin, Conn. The roof will be covered with their well-known patent anti-condensation corrugated iron roof covering.

Randolph & Clowes of Waterbury, Conn., have placed the contract for the extension to their muffle room with the Berlin Iron Bridge Company of East Berlin, Conn.

The Youngstown Car Mfg. Company, Youngstown, Ohio, are erecting an addition to their plant.

Committees of the creditors of the C. Aultman Company, the Sun Vapor Street Light Company, both of Canton, Ohio, and the Akron Iron Company, Akron, Ohio, are trying to effect a settlement.

The plant of the Westinghouse Air Brake Company, Wilderming, Pa., commenced this week to work full time, after running four days a week, of seven hours each, for the past year and a half.

William Deering & Co., are erecting a large twine factory in connection with their harvesting machine works at Chicago. The building is three stories high and covers an area of 266 x 140 feet. It is built of brick, the interior being of modern mill construction. The mill will have 600 spindles and will have a daily capacity of 40 tons of finished twine. The power will be supplied by the 3000 horse-power Allis engine which operated the intramural railway at the World's Fair. This will be the largest mill west of the Alleghenies and one of the largest in the world. In addition to this the Deerings are building a new twine warehouse, three stories, 90 x 283 feet. It will have a storage capacity of 5000 tons of fiber.

Another smelter is to be built for the Lanyon Smelting Company of South Waukegan, Ill., manufacturers of spelter. Its capacity will be about the same as the one now running, which is about 60,000 pounds per day. It will be modeled after the old one, with the same kind and number of retorts and condensers. The company found it impossible to fill all their orders and were compelled to enlarge their business.

The H. K. Porter Company of Pittsburgh, manufacturers of light locomotives, have just completed a narrow gauge engine for shipment to South America.

A committee of the bondholders of the United Brass Company of Lorain, Ohio, have recently examined the plant with a view of putting it in operation at an early date.

The plant of the Youngstown Iron & Steel Roofing Company, Youngstown, Ohio, has been completed and thoroughly equipped with modern machinery. The new plant is located at Haselton, a suburb of Youngstown, and the location is an excellent one, both for shipping and receiving purposes. The firm have already received quite a number of orders for iron and steel roofing, and have furnished the siding and roofing material for the new building of the Union Iron & Steel Company, Youngstown, Ohio. The new firm have opened branch offices in New York, Chicago, Buffalo, Pittsburgh and Richmond, Va.

Boston Bridge Works, Boston, Mass., have recently completed a notable piece of structural work in the Worthington Building, corner State and Congress streets, Boston. This building is a ten-story office structure of irregular shape, being 87 feet long by 38 feet at one end and 25 feet at the other. Its frame is entirely of steel and its construction generally is unusually heavy. One of its unique features is the use of built girders instead of eye beams, which is designed to give additional shape and stiffness to structure. The frame is to

be inclosed in a masonry shell of stone and brick.

The factory of the Bettendorf Metal Wheel Company, at Davenport, Iowa, has been burned, at a loss estimated at \$40,000; insured for \$18,000.

The Crescent Sheet & Tin Plate Company, composed principally of Cleveland, Ohio, capitalists, have recently been granted a charter of incorporation. The new concern have purchased land at Newburg, situated outside the city limits of Cleveland, and will erect thereon a modern four-mill tin plate plant with capacity for turning out between 2000 and 3000 boxes of tin plate each week. The buildings will be entirely of iron and the contract for their construction will be let during this week. The contract for the rolling and shearing machinery, consisting of four 24 x 32 inch hot mills, four 20 x 30 inch cold mills, four 32-inch doubling shears and engines, two 36 inch squaring shears, one 6 x 1 inch bar shears and engine, and a 36-inch roll lathe, has been awarded to the Frank-Kneeland Machine Company of Pittsburgh, Pa. The contract for the engines was given to the Rankin & Fritsch Foundry and Machine Company of St. Louis, Mo., and consists of a 34 x 72 inch engine for driving the hot mills and a 24 x 48 inch engine for driving the cold mills. It is expected to have this plant in operation about March, 1895.

The coal, coke and pig iron business formerly carried on at Buffalo, N. Y., by E. L. Halstrom, deceased, has been purchased by Anna M. Hedstrom, Arthur E. Hedstrom and Alice Hedstrom Douglas, who will continue to conduct the business under the firm name of E. L. Hedstrom. Arthur E. Hedstrom, who was associated with his father, will assume the management of the business.

An order in council has been issued by the Canadian Government amending the regulations governing the payment of drawbacks on duties on articles entering into the construction of goods manufactured in the Dominion for export. Hereafter 99 per cent. of the duty paid will be refunded instead of 90 per cent. The change will place Canadian manufacturers in an extremely favorable position to compete in foreign markets with the manufactured products of other countries.

Officials of the Pennsylvania Railroad Company have decided to increase its standard of weight of steel rails on its main line from 85 pounds to 100 pounds. On the recent tour of inspection this matter was given considerable attention, and the change was only deemed advisable after the matter had been thoroughly discussed. The change is to go into effect next year, and all new rails between Jersey City and Pittsburgh will be of the new standard. The increase in weight is principally due to the heavier locomotives which the company have gradually been acquiring, besides the increase in speed. The 100 pound standard is a big jump from the weight rail used years ago. Then 56 pounds was considered heavy enough, but soon the weight was increased to 67, then to 75, and then to 85 pounds. The last weight has been the standard for several years, and to all appearance has met the requirements. A few years ago 100-pound rails were placed in various sections of the road for experimental purposes, and as they fulfilled all that was expected of them, it was decided to use this weight as the standard until further change. Besides increasing the weight there will be, in all probability, a change in the length of the rail. At present a 30-foot one is generally used,

although in some places they are twice that length. The length of the majority of the new rails will be 60 feet. This is a saving of joints, thus giving a smoother surface.

General Flagler, Chief of the Bureau of Ordnance, in his annual report states that carriages for modern guns have been already constructed at the Watertown arsenal. These include 42 inch gun lift; and non-disappearing carriages, and 8-inch non-disappearing carriages, while there are at present being built bar-bette carriages for 10-inch guns and estimates have been made for disappearing carriages for 10-inch guns. The arsenal is now equipped for producing large castings, such as the platform plates used for mounting guns at the proving ground at Sandy Hook and other special massive castings requiring high tensile strength. The output from the arsenal of sea coast guns of regulation pattern during the year was 11 8 inch, 11 10 inch and six 12 inch. In addition, one 10 inch wire wound Crozier gun has been completed and work is in progress on seven 12 inch mortars. With the additional machinery already installed the output per annum will be, as anticipated, 12 8-inch, 15 10 inch and 15 12-inch guns.

The Census Bureau has lately promulgated a bulletin on the manufactures of the United States, which contains some very interesting information as to their condition at the late census. The document gives statistics of 67 industries, each turning out a yearly product of \$30,000,000 or over, included in which are the iron and steel, cotton, wool, lumber, oil, leather, flour and grain, and other leading industries. Of these 67 industries 287,591 establishments were reported, or 80.89 per cent. of the total number in the United States. These establishments represent an aggregate invested capital of \$5,249,139,842, or 45 per cent. of the total capital for all kinds of industries. In them are employed 3,730,557 persons, receiving \$1,811,186,882 in wages, or 79.17 per cent. of the employees and 79.34 per cent. of the wages of all industries. The cost of materials used was \$4,273,402,066, or 82.84 per cent. of the total cost of materials for all industries. The value of product is shown as \$7,618,836,200, or 81.81 per cent. of the total of all manufactured products in the United States in 1890.

The plethora of money continues unabated. Saturday's statement of the New York banks showed, however, an increase in loans to the extent of \$1,129,300, but deposits at the same time increased \$309,700. The banks now hold \$63,204,275 surplus reserve over the legal requirement; and, notwithstanding the recent action of the banks in reducing interest on out-of-town deposits, the flow of money from the interior appears to be unchecked.

The coal tests to be made by the "Montgomery" at Pensacola are exciting interest among the large producers here. The conditions that not less than 100 tons are acceptable for trial shut out the smaller mines. The Sloss Iron & Steel Company, Tennessee Coal, Iron & Railway Company and the Standard Coal Company have so far expressed their determination to send coal for trial and the results are looked forward to with great interest.



## The Iron and Metal Trades.

As the result of the elections, an improvement in business is expected by the majority of those who control large industrial operations. That feeling alone may go far toward bringing it about. In calmer mood the somewhat extravagant predictions now current may be withdrawn. But there is very good foundation for the hope of better times to come.

All doubt is now removed concerning any unwise legislation on the currency question, a fact which will tell a good deal with the timid holders of idle money. Then there is the further assurance that there will be no further hostile action on the tariff for a long time to come. With these perplexing questions out of the way capital may begin to look about for a chance to earn good interest instead of being chiefly concerned with the safety of the principal.

Many meritorious schemes have been lying dormant since the panic. The time seems to be approaching when some of them may be taken up. We heard lately of instances in which projects have had a hearing, which is a good deal more than was granted a month or two ago. It is clear that confidence is growing slowly, and it is the most important fruit of the elections that that process may be quickened in the near future.

One feature in the situation in the Iron trade proper deserves more consideration than has yet been given to it. It is a remarkable fact that in the area of production of cheap Pig Iron from Lake Ores and Connellsville Coke the capacity is practically fully employed. In the whole districts embracing Buffalo, the Shenango Valley, the Conemaugh, Pittsburgh, the Mahoning Valley, Cleveland, Wheeling and the Ohio River there are very few modern furnaces out of blast. On October 1, these districts were making with 72 furnaces close to 86,000 tons of Iron per week. On November 1 they were turning out close to 89,000 tons per week. All of the furnaces out of blast in that whole great region could not, at present prices, add 5000 tons a week more than that total.

The only reserve of really modern plant located to assemble materials to advantage and produce at low cost is to be found in the Chicago district.

This means that if there is any quickening in the demand, notably for Bessemer Pig, it cannot be supplied by those producers who are making Iron at low cost. It is a well-known fact that even now demand and supply in the markets referred to are very closely balanced. While it is possible that the consumption may soon fall off, with the approach of the usual midwinter dullness, it is a fact that should be carefully kept in mind that what might be termed the area of low cost is being drawn upon close up to its maximum capacity.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, November 7, 1894.

The past week has been decidedly quiet in all lines. Much of this is attributed to the election excitement. Numerous cases are reported in which important deals are pending that have been postponed until the latter part of this week or the week following. It is expected that trade will be considerably better during the remainder of the month.

**Pig Iron.**—Dealers unite in reporting a very moderate volume of business. Inquiries are good, however, and trade is by no means ended for the fall season. Excellent orders are in prospect in local Coke Iron which will be closed within the coming ten days. Some Southern sales have recently been made here in sufficient quantities to indicate that a reasonable amount of business may still be expected in this locality by Southern makers. Prices on Southern Iron have been reduced with a view to increasing the trade in this class of Iron. Lake Superior Charcoal continues quiet. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$13.00 @	\$15.00
Local Coke Foundry, No. 1....	10.25 @	11.00
Local Coke Foundry, No. 2....	10.00 @	10.25
Local Coke Foundry, No. 3....	9.50 @	10.00
Local Scotch.....	10.25 @	11.00
Ohio Strong Softeners, No. 1..	13.00 @	13.50
Southern Silvery, No. 1.....	11.50 @	11.75
Southern Silvery, No. 2.....	11.25 @	11.50
Southern Coke, No. 2.....	10.25 @	10.50
Southern Coke, No. 3.....	9.75 @	10.25
Southern, No. 1, Soft.....	10.25 @	10.50
Southern, No. 2, Soft.....	9.75 @	10.25
Alabama Car Wheel.....	17.50 @	18.00
Jackson County Silvery.....	15.50 @	16.00
Other Ohio Silvery.....	14.25 @	14.50
Coke Bessemer.....	11.25 @	11.50
Coke Malleable.....	10.50 @	11.25
Spiegeleisen 20 %.....	..... @	26.00

**Bars.**—Transactions have increased but the volume of business is still below what it should be at this time of the year. Very small orders are the object of severe competition by all manufacturers doing business in this locality. Quotations on mill shipments of Common Iron are continued at 1.02½¢ @ 1.05¢, Chicago, but these rates are shaded. On good specifications guaranteed Iron is steady at 1.15¢ @ 1.20¢, and Soft Steel Bars from strictly Billet stock are unchanged at 1.20¢ @ 1.25¢. Jobbers are selling small lots at 1.15¢ upward for Iron, and 1.25¢ upward for Soft Steel.

**Structural Material.**—The three bridge contracts on the drainage canal have not yet been placed, although bids were opened last week. Small lots of Bridge Material and Building Shapes are in fair demand, but nothing large is now immediately in sight. Quotations for mill shipments, Chicago delivery, are as follows: Beams and Channels, 1.50¢; Angles, 1.40¢ @ 1.45¢; Tees, 1.65¢; Universal Plates, 1.40¢ @ 1.45¢. Small lots of Beams and Channels from stock, 1.75¢ @ 1.90¢; Angles, 1.50¢ @ 1.60¢; Tees, 1.70¢ @ 1.80¢.

**Plates.**—Dealers appear to have been more favored than manufacturers' agents in the business taken recently. The former report good orders for both mill shipments and from stock. We continue prices on mill shipments, Chicago delivery, as follows: Tank Steel, 1.40¢ @ 1.50¢; Flange Steel, 1.65¢ @ 2.10¢; Fire Box, 1.65¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.70¢ @ 1.80¢; Tank Steel, 1.50¢ @ 1.65¢; Flange Steel, 2¢ @ 2.15¢; Boiler Tubes, in carloads, 75 % off.

**Sheets.**—Manufacturers of Black Sheets are catching up to their orders, and are now soliciting business with a little more vigor. Prices are unchanged, mill shipments of No. 27 Common Iron for early delivery being quoted at 2.35¢ @ 2.40¢, Chicago; Steel Sheets, 2.45¢ @ 2.50¢. The situation is unsatisfactory in Galvanized sheets, prices being weak under competition from some of the less known mills. The standard brands are being held up fairly well at 75 and 10 and 5 % @ 75 and 15 %. Sheet Copper stands at 14¢ base. Small lots of No. 27 Common Black Sheets from stock are quoted at 2.40¢ @ 2.50¢, and Galvanized Sheets, 75 and 10 % off.

**Merchant Steel.**—A fair business was placed during the early part of the week, but matters became very quiet toward the close. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 1.50¢ @ 1.60¢; Smooth Finished Tire, 1.50¢ @ 1.60¢; Open Hearth Spring Steel, 1.75¢ @ 1.80¢; Bessemer Machinery, 1.40¢ @ 1.45¢; Bessemer Fire, 1.40¢ @ 1.45¢; Ordinary Tool Steel, 5½¢ @ 7¢; Specials, 10½¢ and upward.

**Billets and Rods.**—The situation is unchanged, the local mills being extremely busy and no open quotations are being made.

**Rails and Track Supplies.**—The end of the season is near at hand and the railroads in this vicinity have apparently taken all the Steel Rails they will need for this year. Some orders are in sight from the Southwest, and it is expected that enough business will be secured from that locality, together with orders now on the books, to keep the local works employed well into the month of December. No orders have come up for next year. Quotations are continued as follows: Standard Rails, \$25 @ \$27; Steel Splice Bars, 1.25¢ @ 1.35¢; Track Bolts, with Hexagon Nuts, 1.90¢ @ 2¢; Spikes, 1.65¢ @ 1.75¢; Links and Pins, 1.65¢ @ 1.70¢.

**Old Rails and Car Wheels.**—Railroads are soliciting offers on their stocks of Old Iron Rails. Consumers hesitate to bid even \$10.50. Old Steel Rails are now quoted somewhat lower at \$7 for short pieces and \$10 for long lengths, Pittsburgh. Consumers are now drawing very little from this market; a sale 1500 tons of Old Car Wheels is reported at an outside point. Dealers here are doing very little and bid \$9.50, while holders ask \$10.

**Scrap.**—Trade has been inclined to quietness the past week and very little has been done to indicate whether values have changed or not. Dealers quote the following selling prices per net ton: Railroad Forge, \$9; Dealers' Forge, \$8.50; No. 1 Mill, \$7; Pipes and Flues, \$7; Axles, \$13; Heavy Cast, \$7.50 @ \$7.75; Stove Plates, \$5.50 @ \$6; Cast Borings, \$3.50; Wrought Turnings, \$5.50; Axle Turnings, \$6.25; Fish Plates, \$9.50 @ \$10; Horseshoes, \$9.25; Mixed Steel, gross ton, \$6; Heavy Melting Steel Scrap, \$7 @ \$7.50.

**Metals.**—Lake Copper is quoted at 10¢ in carload lots. Casting Copper is very quiet, with quotations unchanged at 9½¢ @ 9¾¢ according to brand and quantity, but prices are weak. Spelter has been sold in single carload lots at 3.25¢. Pig Lead is dull but remarkably firm at 2.95¢ for spot.

**Later.**—Two thousand tons Wire Rods sold to Western consumer at



something under \$24; 2000 tons heavy Melting Steel Scrap sold at \$7.50.

After 17 years of continuous active service in the management of the Chicago branch of the Washburn & Moen Mfg. Company, H. B. Cragin now retires, having accepted an important position in connection with the barbed wire interests of the country. The Chicago office was established by him and its present importance is largely due to his efforts. He has been succeeded by C. T. Boynton, who has been manager of the company's new mill at Waukegan, Ill. since it was started three years ago. Mr. Boynton was for many years connected with the Chicago office, and when the new works were erected was placed in charge. His promotion to the management of all the company's business in Chicago and Waukegan is an appropriate recognition of his able administration of the large interests which have been under his care.

## Pittsburgh.

Office of *The Iron Age*, Hamilton Building, }  
PITTSBURGH, November 6, 1894. }

Almost the entire attention of the trade is diverted to the elections, and business for the time being is put aside. Under these conditions it is hardly necessary to state that the week has been a very quiet one and transactions few. Prices show little change, with the exception of Bessemer Pig, which is weaker. Steel is holding its own and in some sections views of makers have stiffened up. Finished material is in fair request at unchanged prices. Talk is going of another Coke strike, and November 15 is the date given on which the men are to go out, but little attention is given to the report. It is the general belief that it is being sprung in order to affect the Pig Iron market. As we get closer to the end of the year the belief increases that 1895 will be ahead of 1894 in volume of business, but not so much faith is attached to betterment in prices early in the coming year.

**Pig Iron.**—The tremendous production of Pig Iron during the past two or three months is beginning to tell and several Valley furnaces are piling Iron. It is understood that this is being done in preference to forcing their Iron on the market and thus pushing values down, and also for the reason that some furnacemen believe that prices of Pig about the first of the year will be better than they are now. The demand for Bessemer Iron is very light just now and prices have sagged downward during the week. The market on Gray Forge is quiet, but prices are unchanged on the basis of \$9.75, Pittsburgh. Reports are going that \$9 at Valley furnace, equal to \$9.65, Pittsburgh, has been done on Gray Forge. A slightly better demand is noted for Foundry Iron, due to the fact that work among the foundries is a little more plentiful. We quote the market as follows:

Neutral Gray Forge.....	\$9.75 @ \$9.00 Cash.
All-Ore Mill.....	9.75 @ 10.00 "
No. 1 Foundry.....	11.65 @ 11.75 "
No. 2 Foundry.....	10.75 @ 11.00 "
Bessemer.....	10.75 @ 10.90 "

We note a sale of 3000 tons of Bessemer for November and December at \$10.75, Pittsburgh; also 300 tons of Gray Forge at \$9.75, Pittsburgh, and a sale of 100 tons of No. 2 Foundry at \$10.75, Pittsburgh.

**Ferromanganese.**—We quote at \$50 for 80 % domestic. It is probable this

price would be shaded, however, for a firm offer, as foreign has been laid down here at less than the above price.

**Billets.**—There is a fair demand for Steel, but for small lots only. Considerable Steel for Eastern delivery has been sold within the last month, but most of it is from districts outside of Pittsburgh. The Wheeling mills are reported as being firmer in their views on Steel and some low quotations have been withdrawn. Pittsburgh mills continue to ask \$15.75 @ \$16 and are refusing to shade our lower quotation. A local mill has rearranged its wage scale and some reductions in wages of tonnage men have been made.

**Structural Material.**—The demand has fallen off considerably and a local mill has gone on five days a week, said to be due to lack of orders. The only order of importance given out for some time was one for some 3000 tons of Beams for New York City, taken by a local mill at a low price. We quote as follows: Beams and Channels up to 15-inch at 1.25¢ @ 1.35¢; Angles and Universal Plates, 1.15¢ @ 1.20¢, Tees at 1.35¢ @ \$1.40¢.

**Plates.**—The volume of trade is fair, but is for small lots only. Some mills that have considerable work on their books are declining to meet the lowest prices. We quote as follows: Tank Steel at 1.20¢ @ 1.30¢; Flange, 1.35¢ @ 1.40¢; Shell, 1.30¢ @ 1.35¢. For a very desirable order our lower quotation on Tank Steel might be shaded about \$1 ¢ ton.

**Muck Bars.**—We make nominal quotations of \$18.75 @ \$19 for best grades, delivered at buyer's mill. There is nothing doing.

**Bars.**—Some mills report a slightly better inquiry. It seems certain that any change to come must be for the better, as the condition of the Bar Iron market could hardly get worse. The readjustment of West bound freight rates, which carries slight advances to some points, to go into effect on December 1, is hastening shipments. While prices are not higher they are firmer, and some mills are refusing to meet the very lowest prices. We quote Common Iron Bars at 0.95¢ @ 1¢ and Soft Steel Bars at 1¢ @ 1.05¢, with the usual extras.

**Sheets.**—The demand for Black Sheets is not as urgent as it was, but for prompt shipments mills are still able to get very close to prices ruling when the demand was at its best. Buyers who are in position to contract now for deliveries in the next two or three months would have concessions offered. We quote No. 27 Common Iron, for prompt delivery, at 2.20¢ and No. 27 Steel at 2.30¢; Galvanized Sheets are slightly lower in price, the demand having fallen off to some extent and mills are more eager for business. We quote at 75 and 15 % @ 75 and 10 and 5 % for standard brands.

**Merchant Steel.**—The situation is slightly improved, there being a little better demand, and specifications are coming better than for some time past. Prices show no decided change, and we continue former quotations, as follows: Bessemer Machinery, 1.15¢ @ 1.25¢; Open Hearth Spring, 1.50¢ @ 1.60¢; Open Hearth Machinery, 1.40¢ @ 1.50¢; Machine Straightened Tire, 1.50¢ @ 1.60¢; Sleigh Shoe, 1.50¢ @ 1.60¢; Toe Calk, 1.70¢ @ 1.75¢.

**Wire Rods.**—There is nothing doing, and several of the local mills are shut down temporarily until there is an improvement in the demand. We make nominal quotation of \$22.25 @ \$22.50, at maker's mill.

**Skelp Iron and Steel.**—The demand is moderate and prices are unchanged. We quote as follows: Grooved Steel Skelp, 1¢ @ 1.10¢, according to size; Sheared Steel Skelp, 1.15¢ @ 1.20¢; Grooved Iron Skelp, 1.20¢ @ 1.25¢; Sheared Iron Skelp, 1.30¢ @ 1.35¢.

**Pipes and Tubes.**—Business is light and some low prices are being made in Boiler Tubes and Pipe. A local mill is credited with taking quite a large order for Boiler Tubes for Eastern shipment at an exceptionally low price.

**Barb Wire.**—The volume of business offering for shipment this year is light, but some large orders have been placed for delivery next year. We quote Four-Point Galvanized at \$1.95 @ \$2.05 at mill. We quote Plain Wire at \$1.20 @ \$1.25 in carload lots at maker's mill.

**Wire Nails.**—An improved demand is noted, and prices are more settled than they have been for some time past. Some heavy sales of Wire Nails for delivery next year have been made. We quote Wire Nails at 95¢ @ \$1.05, according to quantity. Cut Nails may be quoted at 90¢ at mill for usual averages.

**Connellsville Coke.**—For the first time in some weeks production and number of active ovens show an increase. For the week ending Saturday, October 27, there were 14,354 ovens active and 3220 idle, the production for the week in question being estimated at 141,826 tons. Compared with the production of the previous week this was an increase of 2816 tons. In the active list of ovens there was a net gain of 31. We continue to quote Furnace Coke at \$1 and Foundry Coke at \$1.15 ¢ ton to consumers. Furnace Coke for balance of the year has been sold as low as 90¢ ¢ ton, but this price would not be accepted for delivery after the first of the year. Reports are going of another strike in the Connellsville region to be inaugurated on November 15, but they are generally discredited.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., }  
PHILADELPHIA, Pa., November 6, 1894. }

On the eve of an exciting election, such as the one now in progress, it seems useless to attempt to write anything in regard to the market for Iron and Steel, except to say that up to this time there has been no change from last week. As regards the prospects apart from the political situation, it cannot be said that they are good. In some lines business is fair, in others it is less active than it was earlier in the season. There is a vast amount of business that ought to be done, and would be done if money was in hand to carry it through. Money is abundant enough, it is true, but those who would buy Rails and cars and locomotives, and those who need them most, have the least money to go to market with. This will be overcome in time, but it will need time, as bankers will require just as full security after the elections as they do before. The point we wish to make is that it will take time to turn around, and while the outlook will be immensely improved by the Republican victory, it will be a mis-

take to suppose that big orders will be rushed into market forthwith. Preparatory work will commence, but the harvest will be later on. There is yet a large amount of unemployed capacity, and until that is in operation with a fair backing of orders, it will be futile to expect any but a very modest appreciation in values. Meanwhile last week's quotations stand good to-day, although it is hoped that next week we may be able to say "firmer with a more active demand."

Mr. Robert M. Cunliffe has purchased the interest of his deceased partner, Adolph Bussenius, and will continue the business at the old stand, 1142 Washington avenue, Philadelphia, as dealer in Scrap Iron and Old Metals of all descriptions.

## St. Louis.

(By Telegraph.)

Office of The Iron Age,  
Bank of Commerce Building,  
St. Louis, November 7, 1894.

**Pig Iron.**—Since our last report sales have not increased very materially. There are a number of inquiries in the market which if they result in sales will make a good showing. Consumers state that they are able to shade the market and do not feel that the time for heavy buying has as yet arrived, and continue to buy as their actual requirements demand. There is a gradual increase in the demand from all quarters, and while there is no great improvement anticipated until after the turn of the year a fairly satisfactory business seems assured for the next two months. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	.....	\$10.75 @ \$11.00
Southern Coke, No. 2 Foundry	.....	9.75 @ 10.00
Southern Coke, No. 3 Foundry	.....	9.50 @ 9.75
Southern Car Wheel	.....	16.50 @ 17.00
Gray Forge	.....	9.00 @ 9.25
Ohio Softeners	.....	14.00 @ 14.50

**Bar Iron.**—The demand for Bar Iron shows some improvement. Prices have also taken a slight upward turn and 1¢ @ 1.05¢ is now quoted, the latter figures prevailing in most of the transactions recorded. Car manufacturers are better employed and are buying more liberally in consequence.

**Barb Wire.**—There is no change to note in this department. As is expected at this season the demand is only fair, while prices remain unchanged. Painted is quoted in carload lots at \$1.65 @ \$1.75; Galvanized, 40¢ @ hundred-weight additional.

**Wire Nails.**—Notwithstanding the agreement entered into by the Nail manufacturers to regulate the price of Nails there continues to be sufficient quantities offered to keep the price hovering around \$1 @ keg. Jobbers are selling only moderate quantities and quote \$1.10 @ \$1.15.

**Rails and Track Supplies.**—The railroad buying noted in our last report continues. In the way of Rails several sales of light sections are reported, with a number of inquiries now in process of being closed. Track Supplies are quoted as follows: Splice Bars, 1.15¢ @ 1.20; Spikes, 1.60¢ @ 1.65; Bolts, Square Nuts, 1.80¢; with Hexagon Nuts, 1.90¢; Steel Links and Pins, 1.50¢; Iron, 1.60¢; Steel Rails, \$26.50 @ \$27; Old Iron Rails, \$11 @ \$11.25.

**Pig Lead.**—The prices have not varied very much during the last week.

Sales have been made at from 2.95¢ to 3¢ and sellers are asking the latter figure at the close to day.

**Spelter.**—Sales of Spelter have been largely confined to carload lots, which have been taken at 3.20¢. There is no disposition among consumers to anticipate their wants, so the demand is largely of a hand to mouth character.

## Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fifth and Main Sts.,  
CINCINNATI, November 7, 1894.

There has been only a jobbing demand for Pig Iron during the week, and it was scattered through this district, the North and to a very moderate extent the East. There have been bids made at lower prices for larger quantities, although not for any very large lot, and yet these bids were declined by the Southern furnaces, for they assert that prices are down to rock bottom now, and that any change must be to higher rates, for the condition of labor in the South makes this imperative, and there are some buyers who assert that the market is weak. That it is quiet all admit, but there is no disposition apparent to accept lower prices. There is much complaint that cars in the South are so generally required for moving cotton that the movements of Pig Iron are restricted, but there is no urging to ship Pig Iron in this direction. There is no new factor in the consumptive side of the market, and dullness is the prominent feature all around. Quotations are as follows:

### Foundry.

Southern Coke, No. 1	.....	\$10.00 @ \$10.25
Southern Coke, No. 2	.....	9.50 @ 9.75
Southern Coke, No. 3	.....	8.75 @ 9.00
Ohio Soft Stone Coal, No. 1	.....	14.50 @ 15.00
Ohio Soft Stone Coal, No. 2	.....	14.00 @ 14.50
Lake Superior Coke, No. 1	.....	12.00 @ 12.50
Lake Superior Coke, No. 2	.....	11.00 @ 11.50
Hanging Rock Charcoal, No. 1	.....	16.00 @ 16.50
Hanging Rock Charcoal, No. 2	.....	15.50 @ 16.00
Tennessee Charcoal, No. 1	.....	13.00 @ 13.50
Tennessee Charcoal, No. 2	.....	12.00 @ 12.50

### Car Wheel and Malleable Irons.

Standard Southern Car Wheel	.....	15.75 @ 16.75
Lake Superior Car Wheel and Malleable	.....	14.25 @ 14.75

### Forge.

Gray Forge	.....	8.50 @ 8.75
Mottled Coke	.....	8.25 @ 8.50

## Metal Market.

**Pig Tin.**—Immediately after the date of our last report prices for Straits Tin were forced up to about 14.90¢ @ 14.95¢, net cash, prompt and future delivery. Since then a reaction to 14.70¢ @ 14.75¢ has taken place. Several hundred tons changed hands in the meantime, the bulk of it in the nature of closing out old deals. Further than the movement in prices and the speculative deals there is nothing to report. Jobbers and consumers have purchased very conservatively and seem to be bothered little by the ups and downs of the speculative market, since with the strongest complexion put upon the statistical position it is found that there is not only enough Tin to go around, but some to spare. In fact, the visible supply is still abnormally large and the records indicate that the deliveries latterly have swelled the "invisible" supply in no small degree. At the close of the week the market was unsettled, with 14.60¢ @ 14.65¢ apparently all that could be realized for round lots on net cash terms. Jobbing parcels were dealt out at 14.75¢ @ 14.85¢, usual store terms.

**Copper.**—The market remains in *statu quo*. There has been little or nothing more than routine business, and that was mainly of the most commonplace type, rarely involving more than small lots for early delivery. This class of orders has been filled at about former prices, namely, 9.55¢ for Lake Superior Ingot, 9.40¢ for Electrolytic, and 9.20¢ @ 9.30¢ for ordinary casting stock. Nothing tangible comes out regarding deals involving round lots for delivery next year, and there is remarkable silence about the progress of negotiations to govern or restrict production. The one suggestive feature is that there seems to be enough Copper to go around.

**Pig Lead.**—There is perhaps a shade better tone to the market, but business here has been of moderate proportions and the demand only fair. The firmness would seem to be due chiefly to Western business that amounted to considerable in the aggregate. About 3.12½¢ here is apparently bottom price for prompt or early shipments.

**Spelter.**—Business has been fair and the demand is somewhat better, making, upon the whole, quite a firm market. It is doubtful if other than inferior brands can be purchased at less than 3.40¢, delivered, here or at other Eastern points; 3.45¢ is generally asked for popular brands and some sales have been made at that rate.

**Antimony.**—There has been some improvement in sales, but prices are still rather soft, with 8½¢ quoted for Cookson's and 7½¢ @ 7½¢ for Hallett's.

**Tin Plate.**—Dealings have been on a moderate scale and the individual purchases almost invariably are on extremely conservative lines. The supply here has increased and the assortment is more liberal. Prices are barely steady with the following quoted for spot stock: Charcoal Tins: Melyn Grade, one-half X IC, \$5; IX, \$6.50; Lisvane, &c., IC, \$4.80; IX, \$5.25; Al-laway Grade, \$4.25; IX, \$5.05; Siemens Steel, IC squares, &c., full weight, \$4.37½ basis; 100 lb, \$4.10 basis. Bessemer Steel, IC squares, &c., full weight, \$4.30 basis; 100 lb, \$4 basis. Coke Tins, IC, 14 x 20: Bessemer Steel, full weight, \$4.12½; 100 lb, \$3.77½; 95 lb, \$3.67½; 90 lb, \$3.57½. Charcoal Ternes: M. F., IC 14 x 20, \$6; IC 20 x 28, \$12; Worcester, IC 14 x 20, \$4.75; IC 20 x 28, \$8.60; Alyn, full weight, IC 14 x 20, \$4; IC 20 x 28, \$8.05; Alyn, 100 lb, IC 14 x 20, \$3.85; IC 20 x 28, \$7.60; Dyan, full weight, IC 14 x 20, \$4.05; IC 20 x 28, \$8.10; 100 lb, IC 14 x 20, \$3.90; IC 20 x 28, \$7.80; D. R. D. Grade, full weight, IC 14 x 20, \$3.90; IC 20 x 28, \$7.85; 100 lb, IC 14 x 20, \$3.85.

**Stock Warrants.**—The American Pig Iron Storage Warrant Company report as follows:

	Tons.
Stock in yard September 30, 1894	102,800
Put in yard for 31 days, ending October 31, 1894	700
Total	103,500
Withdrawn 31 days, ending October 31, 1894	2,800
Net stock in yard October 31, 1894	100,700

It is estimated that wheat will be used as food for farm animals on one-fifth of the farms in the United States this winter. The *St. Louis Chronicle*, which gives this estimate, is of the opinion that not less than 150,000,000 bushels will be thus utilized this season.

## British Metal Market.

[Special Cable Dispatch to The Iron Age.]

LONDON, November 7, 1894.

Pig Tin was firmer early in the week under the influence of free buying prompted by moderate shipments from the Straits last month and slight decrease in spot stocks. Subsequently a reaction took place owing to the cessation of syndicate support and pressure to sell three months' futures. Prompts were sold at as low as £66. 10/, but recovered on large purchases to cover short accounts. To day the market was steadier, with prices at £66. 15/ for prompts and £67. 2/6 @ £67. 5/ for three months' futures.

Copper weakened to £40. 2/6 for Merchant Bars, prompt delivery, and the market has been dull. Tired holders unloaded when opportunity was offered. Buyers have been reserved, owing to disappointing statistics, continued large arrivals of American and rumors that Lake Superior producers are again quietly selling to consumers at low prices. Large sales of Rio Tinto reported here and quantity of Ingots sold for Continent account. Late dealings in Merchant Bars were at £40 for prompts and £40. 10/ for three months' futures. Best selected English quoted at £43. 10/ @ £43. 15/.

Tin Plate has been dull, and prices still show a declining tendency. A fair business was done at intervals, when makers met buyers' views. Cokes and Charcoals are nominally 3 pence lower. Ternes are about 6 pence down. Light weights continue to be in relatively best demand. Makers propose reducing workmen's wages 25%. Unless a concession is made several works will probably close down. The Avondale works restarted this week. Swansea quotations are as follows:

Bessemer Cokes, IC.....	9/9 @ 10/
Siemens Cokes, IC.....	10/ @ 10/3
J. B. Steel Cokes, IC.....	9/9 @ 10/
Dean Ternes, 20 x 28 ..	18/ @ 20/
Charcoals, IC.....	11/ up.

Exports last month were 41,000 tons, against 27,000 tons last year. The quantity shipped to the United States was 24,000 tons and 13,000 tons respectively. Stocks at Swansea now about 280,000 boxes.

Pig Lead is quiet and prices are at £9. 15/ @ £9. 17/6 for Soft Spanish.

Spelter has dropped to £14. 17/6 @ £15 for ordinary Silesian, and is selling slowly.

Pig Iron warrants have averaged somewhat higher in price, but speculation is tardy throughout. Late dealings were at 42/7 @ 42/3 for Scotch, 35/7½ @ 35/9 for Cleveland and 43/9 for Hematite. Exports of Pig Iron last month aggregated 89,000 tons, against 78,000 tons in October 1893.

Joseph T. Mason has been appointed sales agent of the Reading Rolling Mill Company, Reading, Pa., makers of

Shapes, &c., for New York City and vicinity. Mr. Mason's office is at 29 Broadway.

## Louisville.

LOUISVILLE, KY., November 5, 1894.

General business is very satisfactory, the present volume being equal to that of ordinary years; especially is this the case in Iron and hardware lines. Of course the low range of prices prevents some people making as much money as they are accustomed to do, and it is claimed that the consumer gets this benefit, but most classes of consumers are producers of something else, and their products are likewise affected, as witness the farmer and price of wheat, the lumbermen and prices of lumber to-day, particularly Southern pine. Collections are good, merchants having all the cash they need, and the banks report money easy, yet they are able to keep all surplus well engaged.

The manufacture of one of Kentucky's great products, whisky, will begin between now and January 1, and the builders of certain lines of machinery and copperwork will have plenty to do. Owing to new custom laws extending the bonding period many new warehouses and other buildings will be projected. The Hoop Iron business will also have occasion to boom.

**Pig Iron.**—The condition of trade is in favor of the buyer. Low as prices are some concessions could be obtained if a few large orders should come into the market. Some furnaces are inclined to make a stand and not push sales, being in a position to wait for later lines, which they expect about the first of the year. The only grades of Southern Iron in active demand are Silver Grays. The demand for this abnormal product is so much in excess of supply that few stove foundries can afford or even obtain it. Actual prices are about as follows:

Southern Coke, No. 1 Foundry.....	\$10.00
Southern Coke, No. 2 Foundry.....	9.25
Southern Coke, No. 3 Foundry.....	8.75
Southern Coke, Gray Forge.....	8.25
Southern Coke, Mottled.....	8.00
Southern Coke, No. 2 Soft.....	8.75

**Bar Iron.**—Small orders only are placed, except in cases of car companies. Dealers seem more inclined to let the mills carry stocks. The same conditions prevail with Sheet Iron consumers. Prices on Common Bar 1.05¢ @ 1.10¢, delivered here in carloads. Refined Bar 2¢, 3¢, 4¢ @ 1b. according to qualifications; Charcoal Bloom Boiler Plates, 5¢ @ 1b; Steel Boiler Plates, 1.60¢ @ 2.25¢ @ 1b; Steel Tank Plates 1.40¢ @ 1b. The demand for Pipe is fair, with plentiful supply. Wire Nails have enjoyed a good fall trade, and considering the regular downward course of prices, it is hard to see where the jobbers can come out even. Mills are now quoting to big buyers 90¢, f.o.b., carload lots, for good average. Great disappointment has been experienced by both mills and jobbers in regard to Barb Wire. Stocks bought at low prices remain unsold, and low prices seem to have no effect in stimulating prices. The Bolt factories are full of orders and actually have the temerity to meet together and resolve on higher prices; 85 and 10 % on Common Carriage and 85, 25 and 5 % on Machine Bolts represent the average prices asked by the mills, usual freight allowance.

Exports from the United States in October fell off 16 %, as compared with last year, while imports were 9 % greater.

## Financial.

The occurrence of an exciting election has served to make the week under review an exceedingly dull one in financial and business circles generally. On the Stock Exchange the market was comparatively stagnant and somewhat weak up to the close of last week, owing in part to the reason above referred to and partly to the unsatisfactory condition of the anthracite coal interests and to unfavorable reports of net earnings on several of the granger roads. The market on Monday, however, while extremely narrow showed a firmer tone with a slight gain in prices, owing to a considerable covering of short interests.

Many persons are confidently looking for a rise in prices with a revived investment business in stocks as a result of the elections. The Republican successes, they argue, will mean increased confidence and more buying of securities, as well as a stimulated movement in all lines of trade. With this should go hand in hand a better demand for money and a consequent improvement in the general financial condition, especially in this and other mercantile centers.

The coal road stocks are still heavy, owing to the unsettled condition of the anthracite mining interests. New Jersey Central having been a special object of attack, yielded some 6½ points, and is down to 91½. Lackawanna and Delaware & Hudson have barely held their own in the last few days, while Reading is a trifle stronger. The Granger stocks, although inactive, have developed considerable strength, a fact which was evident in the fractional advance in St. Paul and Rock Island, which took place on Saturday in the face of unfavorable traffic returns from both those roads. The decrease in St. Paul's earnings for the fourth week in October was \$295,634, and the falling off in gross earnings of Rock Island for the month of October was \$526,143. These showings are not, however, so very unfavorable when it is considered that the comparison is made with a time of last year when World's Fair earnings were large.

The general bond market has exhibited a distinct improvement both in the volume of business transacted and in the prices realized. Home demand for these securities for investment purposes has been large, causing a marked strength in the market and an advance in prices all along the line. Atchison and Northern Pacific issues advanced sharply on large dealings. One reason given for the demand for bonds at the present time is the fact that some of the larger Stock Exchange firms have followed the example of the banks and notified their clients that they can no longer pay interest on the balances left in their hands for which they are unable to find profitable employment. These clients, rather than have their money lying idle, have been purchasing bonds. Foreign houses also report a decided increase in European buying of American bonds, some of which have been shipped, and it is expected that a larger amount will go this week. First-class issues of bonds are scarce.

The Howard Harrison Pipe Works, at Bessemer, are planning extensive improvements and calling for bids for 100 coke ovens with gas saving attachments, which gas they expect to utilize under their boilers and for heating core ovens.

# HARDWARE.

## Condition of Trade.

**T**HE ATTENTION GIVEN to political matters during the past few weeks probably interfered somewhat with the volume of business, which, notwithstanding, continues fair though not heavy. The steady, and in the aggregate large, consumption of goods which is constantly going on calls for frequent replenishing of stocks, but merchants are very careful not to buy in excess of their immediate requirements. The year has shown a marked decline in the prices of so many goods and the market is still in so irregular and unsettled a state that they are not disposed to purchase Hardware which they may be called upon to carry until it can be replaced at lower figures. The near approach of the annual inventory also deters them from adding unnecessarily to their stock. A fair proportion of current business is for holiday and winter goods, but miscellaneous and heavy Hardware is also receiving its share of attention. In view of the result of the election an increase of confidence and an improvement in the tone of the market is anticipated.

### Chicago.

(By Telegraph.)

The Shelf Hardware trade is in reasonably good condition. The demand is as large as could be expected under the conditions which have been prevailing this year. The volume of business is much beyond that of last year at this time, although it is still considerably behind that of 1893. The month thus far shows indications of keeping up to the volume of business in October. Some jobbers are in receipt of good orders for seasonable goods, such as Stove Boards, Coal Hods and Stove Furniture, but others report that the very mild weather recently prevailing has considerably interfered with their trade in articles of this character. A cold snap is ardently desired, as it is expected to greatly increase the movement in this line. The demand for Tinware and House Furnishing Goods has expanded remarkably during the past two weeks. Factories are still in arrears on shipments. Orders are of the same character as heretofore, being made up almost entirely of broken packages, but they make up in number what they lack in size. Manufacturers of Aluminum Ware report a steadily augmented trade. Sidney Shepard & Co. are greatly pleased with the success attending their new departure in this line. Heavy Hardware is quiet.

### St. Louis.

(By Telegraph.)

The volume of business continues in the satisfactory condition last noted, and it is pleasant to note that orders are increasing in volume as well as in number. New stocks continue to be sold with considerable regularity. Seasonable weather set in a few days since and the entire trade has felt the effect. Orders for winter goods are coming in with a rush and the local jobbers all have their hands full to ship promptly. The shutting down of the tin plate mills throughout the country has caused a scramble for supplies and jobbers are at their wits' ends to keep their stocks in anything like complete shape. Galvanized iron is also a heavy seller just now. Staples like Barb Wire, Wire and Cut Nails, &c., fail to show any improvement either in price or demand. Builders' Hardware continues to be a leading seller, and the past three months will show that in this line the demand has run far ahead of general expectations. The Bicycle manufacturers are busy making preparations for next year, and as the leading maker of wheels has reduced his price to \$1.00, it is expected that other makers will make similar cuts. The business is in such shape, however, that no demoralization of prices is anticipated.

## Notes on Prices.

**Wire Nails.**—There is little reason for complaint in regard to the volume of business, and some large orders and many smaller ones have been placed with manufacturers during the past week or two. In the matter of prices there is little new to be reported. Ninety-five cents, f.o.b. at mill, for carload lots, is a general price, but it is frequently slightly shaded, and the price of 90 cents is being made on attractive orders.

**Chicago, by Telegraph.**—Manufacturers' agents report an improved volume of business. Inquiries are much larger and sales have been decidedly better. Orders are particularly good from localities which can be reached by water, but buyers from other sections are also taking more than for some little time. Factory prices are still irregular. The leading houses continue to quote for Western business on the basis of \$1.10, Chicago, but these rates are being shaded to meet special circumstances. Jobbers quote small lots from stock at \$1.10.

**Cut Nails.**—The Cut Nail market is without important change, prices being

on the basis of 90 cents for carload lots on dock, New York, with a 60-cent average. Small lots from store in New York are quoted at \$1 to \$1.05. The demand is fair and the tone of the market pretty steady.

**Chicago, by Telegraph.**—The demand on manufacturers is still confined to carload lots, but they are received in sufficient number to keep the local works well employed. Outside manufacturers have recently made some efforts to take part of the trade in this locality, but owing to the fact that they seek orders for 1000-keg lots or more they have been unsuccessful. Factory prices are unchanged at 90 cents, Chicago, on 60-cent average. Jobbers continue to quote small lots at \$1 from stock.

**Barb Wire.**—The Barb Wire market is quiet, with few inquiries for immediate delivery. There is more or less negotiation going on in regard to orders for next season. The market is represented by the following quotations on Four-Point Galvanized in carload lots, at the points named: Pittsburgh, \$1.95 to \$2; Cleveland, \$2 to \$2.05; Cincinnati, Allentown, Chicago and New York, \$2.10 to \$2.15.

**Chicago, by Telegraph.**—Business is quiet both with respect to orders for spring shipment and for fall delivery. Less effort is being made now to book orders for spring delivery by offering favorable terms of shipment. Manufacturers are evidently of the opinion that they will be able to control the trade more closely than in the past and appear disposed to wait for business in the natural way. Manufacturers and jobbers alike report light sales. Small lots of Galvanized continue to be quoted at \$2.25 from stock and \$2.15 from factory. The Plain Wire trade is much better than that in Barb Wire. Manufacturing consumers are buying quite freely.

**Glass.**—The condition of the American Window Glass market shows little improvement since our report of last week, and quotations, it is reported, have been made which appear unnecessarily low. It is understood that prices have been made in the West at less than 90 per cent. discount for both single and double strength Glass in large lots. Such cases are probably the exception rather than the rule, as Pittsburgh and Eastern manufacturers, it is believed, are less ready to make concessions on quoted prices than they have been in the past. Although it is difficult to detect an improvement in this direction it is believed that

prices, on an average over the country, are firmer, and that an improvement may be looked for.

**Iron Rivets.**—The American Screw Company, Atlas Tack Corporation and other manufacturers of Iron Rivets have adopted a revised list under date November 1, which is given in full in the following columns. It will be observed that there are a number of changes in list prices. The discounts announced by the manufacturers are as follows: Sixty-five per cent. on Norway Iron Rivets, and 75 per cent. on Soft Steel or second quality Rivets. The American Screw Company issue a discount sheet under date November 1, in which they quote Rivets under the new list as follows:

Norway Rivets:	Per cent.
Ordinary, in bulk	65
Coopers, "	65
Thousand, "	65
Thousand, in papers	65
Block and Carriage, in papers of 100	65
Hame	65
Belt, with burrs	65
Bay State Rivets	75

The discount sheet also gives quotations on their complete line of goods, including changes on Tire and Sleigh Shoe Bolts recently made.

Block and Carriage Rivets.													
In papers of 100 each. Price per paper.													
Size.	Length.												
	1/8	3/8	1/2	5/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
3/8	\$0.21	\$0.25	\$0.29	\$0.32	\$0.35	\$0.39	\$0.43	\$0.50	\$0.57	\$0.64	\$0.70	\$0.77	\$0.89
1/2 inch	.21	.25	.29	.32	.35	.39	.43	.50	.57	.64	.70	.77	.89
4	.19	.22	.25	.28	.31	.34	.38	.44	.50	.56	.63	.69	.79
5	.16	.18	.20	.23	.25	.27	.30	.35	.39	.45	.50	.56	.64
6	.13	.16	.18	.20	.21	.22	.24	.28	.32	.37	.42	.48	.55
7	.12	.14	.15	.17	.19	.20	.22	.25	.28	.32	.36	.39	.46
8	.10	.11	.12	.14	.15	.17	.19	.21	.24	.28	.30	.32	.37

Coopers' Rivets.						
Price per pound.						
1d	2d	3d	4d	5d	6d	
\$0.16 1/2	.16	.15 1/2	.15 1/2	.15 1/2	.15	
Trunk Rivets—Tinned Iron.						
Price per pound.						
Size.	1/2	7/16	3/8	5/16	1/2	
9	\$0.24	.25	.26	.27	.27	
Hame Rivets.						
Price per pound.						
		6	5/16	7	8	
1/2 inch and longer	\$0.16	.16	.16 1/2	.17		
Tinned Belt Rivets and Burrs.						
Price per pound. Any length.						
	7	8	9	10	11	12
1-pound boxes	\$0.27	.28	.29	.30	.31	.38
1/2-pound boxes	.29	.30	.31	.32	.33	.40
Any of the above sizes, Tinned and not						

Iron Rivets in Bulk.  
Price Per Pound.

Size.	Length of Rivets.												
	1/8	15/32	7/16	13/32	5/8	11/32	5/16	9/32	1/4	7/32	3/16	5/32	3/32
7/16	\$0.15												
3/8	.15	\$0.16											
11/32	.16	.16	\$0.17										
5/16	.15 1/2	.16 1/2	.16 1/2	.16 1/2	.16 1/2	\$0.16 1/2							
1/2	.15 1/2	.16 1/2	.16 1/2	.16 1/2	.16 1/2	.17	\$0.17						
3	.15 1/2	.16	.17	.17	.17	.17	.18	\$0.18	\$0.18				
1 1/4	.15 1/2	.16	.17	.17	.17	.17	.18	.18	.18	.19	\$0.20		
4	.15 1/2	.17	.17	.18	.18	.18	.19	.20	.20	.21	.22	\$0.22	\$0.23
5	.16	.17	.18	.18	.18	.19	.20	.20	.21	.22	.23	.23	.24
6	.16	.17	.18	.18	.19	.19	.20	.20	.21	.22	.23	.24	.25
3 1/16	.16	.17	.18	.18	.19	.19	.20	.21	.21	.22	.23	.24	.25
7	.16 1/2	.18	.18	.19	.19	.20	.21	.21	.22	.23	.24	.25	.26
8	.17	.18	.19	.19	.20	.20	.21	.23	.23	.24	.25	.27	.29
9	.18	.19	.20	.20	.23	.25	.27	.28	.28	.30	.35	.37	.38
10	.19	.20	.21	.22	.23	.25	.28	.30	.31	.33	.37	.40	.45
11	.20	.22	.24	.26	.27	.30	.32	.34	.35	.36	.41	.45	.50
12	.21	.24	.26	.28	.29	.30	.37	.39	.40	.41	.45	.50	.55
13	.25	.27	.30	.33	.34	.35	.40	.41	.41	.45	.50	.55	.60
14	.27	.30	.35	.38	.40	.45	.50	.52	.55	.58	.60	.63	.65

Rivets made from smaller wire than No. 14, all lengths, 70 cents per pound.  
Tinning, 6 cents per pound extra.  
Extras.—Shoulder Rivets and Pointed Rivets, add 2 cents per pound to list.  
Net Extras.—Goods packed in 25-pound boxes, 15 cents per 100 pounds. In packages of 10 pounds and smaller, 25 cents per 100 pounds.

Black and Tinned Iron Rivets in Bulk.			specified, 6 cents per pound advance on above prices.		
Price per pound.			Black and Tinned Swedes Iron Burrs.		
			Price per pound.		
8 ounce	\$0.38	\$0.45			
10 "	.34	.40			
12 "	.31	.37			
14 "	.29	.35			
1 pound	.26	.32			
1 1/4 "	.23	.29			
1 1/2 "	.22	.28			
1 3/4 "	.21	.27			
2 "	.20	.26			
2 1/2 "	.20	.26			
3 "	.19	.25			
3 1/2 "	.19	.25			
4 "	.18	.24			
5 "	.17	.23			
6 "	.17	.23			
7 "	.17	.23			
8 "	.17	.23			
9 "	.16	.22			
10 "	.16	.22			
12 "	.15 1/2	.21 1/2			
14 "	.15 1/2	.21 1/2			
16 "	.15 1/2	.21 1/2			

Black and Tinned Iron Rivets.		
In papers of 1000 each. Price per paper.		
8 ounce	\$0.20	\$0.24
10 "	.22	.25
12 "	.24	.28
14 "	.26	.30
1 pound	.27	.33
1 1/4 "	.29	.37
1 1/2 "	.33	.42
1 3/4 "	.37	.48
2 "	.42	.54
2 1/2 "	.55	.69
3 "	.60	.78
3 1/2 "	.70	.81
4 "	.76	1.00
5 "	.90	1.20
6 "	1.08	1.44
7 "	1.26	1.68
8 "	1.44	1.92
9 "	1.53	2.07
10 "	1.75	2.35
12 "	1.98	2.70
14 "	2.31	3.15
16 "	2.64	3.60

Oval or countersunk heads, or extra lengths, 5 cents per 1000 in addition to the above prices.

**Bernard Folding Dividers.**—The Bernard Dividers, illustrated in our last issue, are sold to the trade at \$11.50 per dozen, subject to a discount of 85 per cent. The Dividers are manufactured by the William Schollhorn Company of New Haven, Conn., for whom Julius Berbecker & Co., 280 Broadway, New York, are agents.

**Woodite Ware**—The Bronson Supply Company, 72 Beekman street, New York, as agents for F. W. Morse, Providence, R. I., have just commenced to introduce a new enameled ware called Woodite, a description of which appeared in our last issue, when an illustration of a Wash Basin was given, this being the only goods in this line which the company are at present prepared to supply. These Basins are sold to the trade at \$50 per gross, subject to a discount of 50 and 10 per cent.

**Brighton Hand Vise.**—This article was described in our last issue as put on the market by the Logan & Strobbridge Iron Company of New Brighton, Pa., by whom it is sold to the trade at the following net prices:

Per dozen.	
4-inch	\$1.25
4 1/2 inch	1.50
5-inch	1.75

**Brighton Coffee Mill.**—The Brighton Pound Coffee Mill, manufactured by the Logan & Strobbridge Iron Company, New Brighton, Pa., and illustrated in *The Iron Age* November 1, is sold to the trade at \$4.25 per dozen, net.



**Fayette R. Plumb.**—A revised discount sheet has been issued by Fayette R. Plumb, Frankford, Philadelphia, in which quotations are given on his extensive line of Hammers, Hatchets, &c. It will be seen that a good many changes are made, most of them being in the way of advance, slightly higher prices being named on some of the goods, among which may be mentioned Riveting, Engineers', B. S. Hand and Machinists' Hammers, also heavy Hammers and Sledges and B. S. Tools. The discount sheet, which applies to his catalogue of 1892 and supplements 1 and 2, is as follows; terms, 60 days, or 2 per cent. for cash in ten days:

	Discount. Per cent.
<b>Hammers.</b>	
"Artisans' Choice," Octagon Pattern Adze Eye Nail.....	40 and 12½
"Artisans' Choice," A. E. B. F. and A. E. Nail.....	40 and 12½
Adze Eye and Adze Eye Bell Face Nail.....	40 and 12½
Plain Eye Nail.....	40 and 12½
Vulcan Tool Company's Adze Eye Nail.....	50 and 10
Vulcan Tool Company's Plain Eye Nail.....	50 and 10
Quaker City Mfg. Company's Adze Eye Nail.....	50 and 10
Brad.....	50
Carpet.....	50
All Adze Eye Farriers.....	50 and 10
Plain Eye and English Farriers.....	50 and 10
"Tinnners' Favorite" Riveting and Paneling.....	50 and 10
"Tinnners" Riveting and Paneling.....	50 and 10
Adze Eye Riveting.....	50 and 15
Plain Eye Riveting.....	50 and 15
Engineers'.....	60 and 5
Blacksmiths' Hand.....	60 and 5
Coopers'.....	60 and 5
Chipping.....	60 and 5
Prospecting.....	60
Carriage Ironers'.....	60
Machinists', Round Pattern.....	60 and 10
"Mechanics' Pride," Octagon Pattern Ball Pein.....	50 and 15
Machinists', Octagon Pattern.....	60 and 10
Horseshoe Turning.....	50
Shoe.....	40 and 10
Bill Posters'.....	40 and 10
Brick.....	40 and 12½
Cornice Makers'.....	40 and 12½
Belgium and Cobble Pavers'.....	40 and 12½
Picks, Prospecting.....	40 and 5
Hatchets, S. C. S., Shingling, Half, Claw and Lath.....	40 and 12½
Broad.....	40 and 12½
A. E. B. P. Shingling and Half.....	40 and 12½
Boston Pattern Lathing.....	40 and 12½
Underhill ".....	40 and 12½
A. E. B. P. ".....	40 and 12½
Chicago Pattern ".....	40 and 12½
Philadelphia ".....	40 and 12½
Fireman's.....	40 and 12½
Ice.....	40 and 12½
Shingling and Lath.....	40 and 12½
Claw and Lathing.....	40 and 12½
Barrel and Broad.....	40 and 12½
Vulcan Tool Company's Shingling and Half.....	50 and 10
Vulcan Tool Company's Claw and Lath.....	50 and 10
Vulcan Tool Company's Broad.....	50 and 5
Warehouse.....	40 and 12½
Axes, Boys' and Hunters'.....	40 and 12½
Broad, Ohio Pattern.....	40 and 12½
"Pennsylvania or Pittsburgh Pattern.....	40 and 12½
Broad, Western Pattern.....	40 and 12½
"New Orleans ".....	40 and 12½
"Canada ".....	40 and 12½
"Ship ".....	40 and 12½
Adzes, Carpenters'.....	40 and 12½
Railroad.....	40 and 12½
Adzes, Ship Carpenters'.....	40 and 12½
Hooks, Bush, Axe Handle, Auckland and Two Ring.....	50
Cleavers and Choppers, wrapped iron handles.....	40
Cleavers and Choppers.....	40
Axes, Butchers', German Pattern.....	40
Cleavers, Butchers', German Pattern.....	40
Beef Splitters.....	40
Hammers, Drilling or Striking, extra Tool Steel.....	70
Hammers, Drilling or Striking.....	75 and 15
Hand Drilling and Stonecutters'.....	75 and 10

Napping.....	75 and 10
Macadamizing.....	75 and 10 and 5
Sledges, Stone.....	75 and 15
Hammers, Stone Breaking.....	60
Axes, Stone.....	70
Hammers, Spalling or Stone.....	75 and 15
Spalling or Stone, Vulcan Tool Company's.....	75 and 15
Reels, Masons'.....	75 and 10
Hammers, Masons'.....	75 and 10
Sorting.....	75 and 10
Bush, with Leaves.....	60
".....	60
Vulcan Tool Company's Drilling or Striking.....	75 and 15
Sledges, Vulcan Tool Company's Stone.....	75 and 15
Blacksmiths'.....	75 and 15
Horseshoe Turning and Coal.....	75 and 15
Vulcan Tool Company's Blacksmiths'.....	75 and 15
Hammers, Blacksmiths' Hand.....	75 and 10
Boiler Makers'.....	60 and 10
Anvils, Plow.....	60 and 10
Swedges, Fullers, Flatters and Hardies.....	70
Set Hammers, Creasers and Punches.....	70
Heading Tools and Pritchels.....	70
Pincers.....	60 and 5
Buttress, Nippers and extra heavy Pincers.....	50 and 5
Button Sets.....	70
Tongs, Straight and Curved Lip.....	60 and 5
Special Patterns.....	60 and 5
Drivers, Coopers'.....	50 and 5
Chisels, Blacksmiths' Cold and Hot.....	70
Rock Drill Sharpening Tools.....	70
Chisels, Hand Chipping and Cape, Extra Tool Steel.....	60 and 5
Chisels, Hand Chipping, Crucible Steel, List, 36 cents.....	60 and 5
Pitching Tools and Points.....	50 and 10
Chisels, Stonecutters' and Brick.....	50 and 10
Wedges, Falling.....	75 and 15
Oregon Pattern.....	70 and 15
"Vulcan Tool Company's,.....	70 and 15
Truckee ".....	70 and 5
Vulcan Tool Company's Truckee Pattern.....	75 and 5
Quaker City Mfg. Company's.....	70 and 10
Stone.....	70 and 10
Coal.....	75
Plugs and Feathers.....	50 and 10
Wedges, Saw.....	70 and 5
Mauls, Wood Choppers', Oregon Pattern,.....	70 and 15
Wood Choppers', Vulcan Tool Company's Oregon Pattern.....	75 and 15
Wood Choppers', Washington Pattern,.....	75 and 15
"Straight cut.....	75 and 15
Ship.....	75 and 10
Railroad.....	75 and 15
Vulcan Tool Company's Railroad.....	80 and 5
Punches, Railroad Track.....	70
Chisels, Railroad Track.....	70
Rail Tongs.....	60
Forks and Wrenches.....	50 and 5
Crowbars, Pinch and Wedge Point.....	70
Bars, Railroad Tamping and Lining.....	70
"Claw.....	70
Picks, Boiler and Mill.....	50
Quarry.....	75 and 10
Stone.....	75 and 10
Railroad.....	60 and 20
"V Tamping.....	60 and 15
"I.....	60 and 15
Ore.....	60 and 15
Contractors'.....	60 and 7½
Surface.....	60 and 15
Drifting.....	60 and 15
Pole.....	60 and 15
Common Eye, Coal.....	60
Adze Eye, Coal.....	60
Mattocks, Long and Short Cutter.....	60 and 20
Long and Short Cutter, Light Pattern.....	60 and 20
Pick.....	60 and 20
Asphalt.....	60
Hoes, Grub.....	60 and 10
Grub, Southern Pattern.....	60 and 10
Froes, Coopers'.....	50 and 10
Picks, Railroad, Solid Cast Steel.....	60 and 20
"V Tamping, Solid Cast Steel.....	60 and 15
Railroad, I Tamping, Solid Cast Steel.....	60 and 15
Surface, Solid Cast Steel.....	60 and 15
Drifting.....	60 and 15
Pole.....	60 and 15
Common Eye, Coal, Solid Cast Steel.....	60
Adze Eye, Coal, Solid Cast Steel.....	60
Eyes, Pick, Railroad and Tamping.....	60 and 15
"Surface and Drifting.....	60 and 15
Stakes, Cornice Makers'.....	50
Hammers, Assorted Nail, Farriers' and Riveting (Supplement No. 1).....	40 and 12½
Hatchets, Nickel Plated Octagon Pole (Supplement No. 1).....	40 and 12½
Silver Bronzed, Octagon Pole, (Supplement No. 1).....	40 and 12½

(Supplement No. 2).....	40 and 12½
Cleavers and Splitters (Supplement No. 2).....	40
Axes (Supplement No. 2).....	40
Knives, Hedge (Supplement No. 2).....	50
Mattocks, Asphalt, Improved Philadelphia Pattern (Supplement No. 2).....	50
Chisels (Supplement No. 2).....	65 and 5
Splitting (Supplement No. 2).....	50
Wedges, Lake Superior Pattern (Supplement No. 2).....	75 and 15
Coal (Supplement No. 2).....	75
California Pattern (Supplement No. 2).....	75 and 15
Hammers, Stone Cutters' Handled (Supplement No. 2).....	50
Side (Supplement No. 2).....	65 and 5
Sledges and Slashing Hammers (Supplement No. 2).....	75 and 15
Mauls, Wood Choppers', Truckee and Lake Superior Patterns, (Supplement No. 2).....	75 and 15
Sets, Hoop, Heavy Pattern (Supplement No. 2).....	50
Tongs, Chain (Supplement No. 2).....	50 and 5
Hammers, Plain Eye Brick (Supplement No. 2).....	40 and 12½
Boiler Makers' Riveting (Supplement No. 2).....	60

**Files.**—The File market is in a condition very far from satisfactory, there being very active competition among some of the leading makers, and as a result prices are low and uneven.

**Axles.**—Under date 27th ult., Cleveland Axle Mfg. Company, Canton, Ohio, announce the following changes in the price of Axles on quantities of 100 or less, taken within usual contract period, with regular terms and freight allowance:

Common and Concord Axles.		Iron. Steel.	
		Cents	Cents
No.		per pound.	per pound.
1,	Common Loose Collar.....	3¼	3
2,	Solid Collar.....	4	3¾
3,	Common Axles, light beds.....	4	3¾
4,	Solid Collar Axles, light beds.....	4½	4¼
5,	Concord Express Axles, loose collars.....	4½	4¼
6,	Concord Express Axles, solid collar, turned box.....	5	4¾
6½,	Or Special Express Axles, solid collar, hard box Spindles.....		5¾
Net Extras, No. 1 to 6½ Axles.			
	Coach shape.....	¼	
	Square and octagon.....	½	
	Short beds, under 20 inches.....	2	
	Size under 1½ inches.....	1	
	Size 3¼ to 3½ inches, inclusive.....	1½	
	Size 3½ to 4 inches, inclusive.....	3	
	Case Hardening.....	¼	
	Welding Axles.....	1½	
	No. 2, 6 and 6½, one piece (in quantities of one size).....	1	

Half Patent Axles.		Discount.	
		Per cent.	
Nos. 7 to 14.....		70	
Nos. 19 to 22.....		70 and 5	

## The Ohio Hardware Association.

**A**CTIVE MEASURES are being taken to increase the membership of the Ohio Hardware Association, the organization of which in Columbus, on October 10, we have already referred to. The formation of county associations is referred to as highly desirable, as through them local abuses can be stopped. Efforts are, therefore, being made in this direction, and the secretary is sending out to the trade circulars giving information in regard to the matter. It is, however, regarded as desirable in order to obtain benefits reaching be-

yond the county limits that the State organization should be strengthened as much as possible, and earnest efforts are being made to secure the co operation of merchants to improve the conditions of the Hardware business.

The scope and object of the association is thus explained in a recent letter from Theodore Butler, the efficient secretary and treasurer of the organization :

The purpose of our association is to count among its members all the Hardware houses in good standing of the State who will approve of the principles of our constitution, and who will do their share toward the improvement of the conditions relating to retail Hardware business. It cannot be to the advantage of either manufacturer or jobber to come in direct competition with their own customers, and for this reason I do not believe that a single jobber will take exception to our principles. I believe that most of the trouble arising from this unjust competition is caused by error of judgment on the part of the men in charge of the correspondence rather than intentional errors of the members of firms, and can easily be avoided. There are many staples (and their number is increasing daily) which are being sold at ruinous prices, and Hardware profits have ceased to return a reasonable revenue to capital invested. It is my opinion (and I have tested the practicability of this opinion) that local organizations should be formed to regulate the prices of staples, and that the Hardware dealers of the counties should be assisted in this local organization by the State organization.

It would be a very difficult task for the secretary of the State association to correspond with the individual members of the State, but on the contrary he could keep in close touch with county associations. A very valuable credit system could be established; complaints against the railroads can be treated with more effect; legislative measures can be promoted, and last, but not least, the social feature of this organization at the yearly meeting on February 2, 1895, will be a source of great pleasure to all members.

## Bicycle Notes.

### The Price of Bicycles for 1895.

**I**N ADDITION to the announcements made in our issue of last week regarding the prices at which various manufacturers will list their Bicycles for the coming season, we are enabled, through the courtesy of other makers, to give further information, which will be of interest to the trade :

F. F. IDE MFG. COMPANY, Peoria, Ill., manufacturers of High Art Bicycles, advise us in regard to their prices for 1895 as follows :

We contemplate building for the '95 trade our racer and road racer at \$150, the Ide Special and Lady's Ide Special at \$140 and the Lady Ide at \$100. Besides these we shall place a machine on the market to compete with other standard makes to list at from \$100 to \$110.

E. B. PRESTON & Co., Chicago, makers of the Czar Bicycle, state that with their experience so far in making wheels, they feel for the present at

least that \$125 should be the list, or selling price at retail; and that they shall so list the Czar for 1895.

THE ROYAL CYCLE WORKS, Marshall, Mich., will list their three high grade wheels for the coming season as follows : The Royal Limited at \$100, the Royal Red Head at \$110, and the ladies' Royal at \$100.

DEMOREST MFG. COMPANY, Williamsport, Pa., expect as usual to have two grades of Bicycles, one to sell for \$75, and the other for \$100. The makers state that the \$100 wheel will have all the nuts, screws and bolts hardened, so that they will retain their shape until the wheel is completely worn out.

THE PEERLESS MFG. COMPANY, Cleveland, Ohio, makers of Triangle Bicycles, will list their line of wheels at \$100, including two for men and two for ladies. Their Blue Bird, a track racer, being a special wheel, will list higher than the other machines.

THE CRAWFORD MFG. COMPANY, Hagerstown, Md., and 72 Reade street, New York, will have on the market for the season of 1895 eight machines listed as follows : Nos. 19 and 20, 28 inch, diamond drop frame, strictly high grade, at \$75; Nos. 17 and 18, 28 inch, diamond and drop frame, at \$60; Nos. 11 and 12, 26 inch, diamond and drop frame, at \$50; Nos. 13 and 14, 24 inch, diamond and drop frame, at \$40. The company state that their line will be second to none in improvements; that every one will be strictly up to date, of highest grade and thoroughly guaranteed.

THE ROCHESTER CYCLE MFG. COMPANY, Rochester, N. Y., will bring out a wheel for 1895, weighing 25 pounds, to meet the demand for a substantial, warranted, first-class light Bicycle at a moderate price, and will list it at \$75. In addition they will place upon the market the regular highest grade Rochester, which they state will contain all the features of excellence that it is possible to combine with the very latest improvements. This wheel will weigh about 22 pounds and will be listed at \$100. In addition the company will make a special Rochester track racer, which will be made extra light and will be listed at \$125.

### Manufacturers' Comments.

Manufacturers, as a rule, are listing their machines in accordance with what may be termed the 1895 price of \$100, and in some cases lower. This they probably see their way clear to do as a result of the diminished cost of material, the use of improved machinery and the increased facilities for manufacturing Bicycles. Some manufacturers, however, state emphatically that they will not be influenced by the policy other manufacturers may pursue depending upon the high grade of their machines and upon the sale and reputation which they have enjoyed in the past to justify a higher list for 1895 than the popular one. A Western

manufacturing concern refer to the situation as follows :

While there may be a reduction in the prices of Bicycles by a few manufacturers, who have found it a hard matter to dispose of their machines, we are not in that boat. Does it not look unreasonable for a manufacturer to reduce the price of his wares unless compelled to do so, and does it not show that the quality is such that they will no longer command their former price? We are now and shall continue turning out the very finest machines that skill, art and science can produce. Such machines cannot be built and marketed at the price that some makers propose to list their '95 product. Instead of setting a list price on our machines and then building them of a quality to correspond, we first build the machine to our ideas and then place on it a list price that we can afford to sell it for. There is a vast difference between the two methods.

After referring to the price of \$100, which has been made for 1895, an Eastern manufacturer writes as follows :

We presume that this will somewhat regulate the price of certain standard high grade wheels. We are firmly of the opinion, however, that the time is past when any one or two concerns in this country can regulate the price of the best Bicycles. We know of some makers who will list their machines, or a part of them, at a higher price than \$100 in spite of the announcement. In fact, we know that there is a demand from a certain class of riders for the best with all the latest improvements, even if the purchasers have to pay a little more for them.

Western manufacturers, in looking at the matter as affecting the jobber and retailer, express themselves as follows :

We did not ask advice from other makers when we began making wheels and have none to offer others. We make strictly a high grade, expensive wheel and we think there is a demand for just such an article. We shall have a price on our particular make of wheel. What other makers may offer or sell their's at will not influence us just at present, whether large or small makers. The quality of the goods will make the price on all makes, later on, we think. The jobber or retailer, or he who is really doing the hard work in selling wheels, however, in our judgment, should have some careful consideration and protection, and if the list price is cut down so low as will leave him with no profit for his work and expense, it surely will kill his energy to push such makes and lessen the sales of all other makers.

A Pennsylvania manufacturer finds no occasion for a cut in price as far as demand is concerned, as the following will indicate :

We see no necessity for a cut in prices, as we find, as in previous years, no difficulty in placing all the machines we can build; we are even now behind on orders and have been for some time. For the past two months we have been working full time, and in addition to this are working four nights each week—a thing unheard of at this season.

A Western manufacturing concern, who expect to place their high grade wheels at high grade prices in 1895, comment upon the situation as follows :

The prices for Bicycles for the coming season is a matter that is creating considerable excitement at the present time in Bicycle circles. We presume that you understand that a company

have issued a circular stating that their standard price will be \$100. What this means we are unable to state, as it does not infer anything outside of those that they have on hand at the present time.

A New York State manufacturing concern give the following reasons for listing their Cycles at popular prices, and also state why they think they will not be losers by so doing :

It has not been customary with our company to come to any hurried conclusions upon so important a subject as that of prices, but consider that it is of special importance for the coming season that prices should become known as early as possible in order that the trade may adjust itself to any changes that occur. Appreciating the fact that your journal is the foremost one of its kind reaching the Hardware trade and that you are taking an active interest in our branch, we write you the first letter on the subject of prices. To begin with, there has been and is a growing demand for a substantial first-class light Bicycle at a price that comes within the reach of the average man's pocketbook. We mean the multitude of riders who want something good in a modern, up to date, light wheel, at a very moderate cost. There have been a number of these machines in previous years upon the market which were listed at the highest grade price, which have come unfairly in competition with more expensive wheels which were in reality better value from the fact that they were standard high grade goods.

We feel that in placing our prices at popular rates and adhering to our established reputation in quality that the large number of increased sales and the natural reduction in the cost of our materials will protect us against losses in profits. In placing the vehicle in the reach of the multitude it will largely tend to increase the popularity of bicycling everywhere.

An Indiana manufacturer, referring to the grade of machines which will be offered for the coming season, remarks as follows :

In a general sense the prices on Bicycles this year is considerably less than during the past season—that is, for the same grade of goods—but I think there is a general improvement in style and quality all along the line. The manufacturer as well as the buyer seem to be anxious to hold up the quality.

### Harrison & Wolfe.

**H**ARRISON & WOLFE, 54 Broad street New York, exporters, will open a branch house and sample room in Mexico City on or before December 1 next. They will represent a number of very prominent American manufacturers among the large trade of that country. This will be on a strictly salary basis, their mission being to increase the trade of their respective houses by being on the spot to exhibit samples, meet and overcome prejudices and objections, explain the intricacies of the various lines and quote prices at which the buyers there can obtain the goods, it being of no interest to Harrison & Wolfe through what channel the order passes. Orders can be sent to commission houses in New York or direct to the manufacturer. Mr. Harrison who has had 20 years' Hardware experience, eight years of which were with Sargent & Co. as export manager, will spend some months

in Mexico establishing the business, in connection with a good Hardware-man who will go from here with him and eventually be left in charge. Mexico is a natural and profitable market for American productions, and it is gratifying to see strong and successful houses reaching out for it.

### Hardware Merchants' and Manufacturers' Association of Philadelphia.

**A** MEETING of this association which, it is expected, will be of more than usual interest will be held on Tuesday evening, November 20, at 6 p.m., in the Hotel Metropole. The subject for discussion will be as to whether or not the present system of syndicate buying is advantageous to the trade.

### Important Cutlery Sale.

**A** MONG our special notices this week E. Bissell, Son & Co., give particulars in regard to the last Cutlery sale of the season, which is set down for Tuesday and Wednesday, November 13 and 14. This important sale will include several thousand dozen Table Knives and Forks, Pocket Knives, Butcher Knives, Carvers, &c., comprising, it is stated, a large line of desirable patterns of fine goods suitable for the Thanksgiving and holiday trade; also silver plated Tea and Table Spoons and Forks, Medium Knives, Dessert Knives, Fruit Knives, Nut Picks, nickel plated Scissors and Shears, &c. A line of silver plated Casters, Tea Sets, Writing Sets, Tea Caddies, Card Receivers, &c., will also be disposed of, together with 50 fine single and double barrel breech loading Guns, and 2,000 pairs of Winslow's American Club Skates, 7½ inch to 12-inch.

### Tool Chests.

**A** MERICAN TOOL COMPANY, 200 West Houston street, New York, are equipped with a well assorted stock of tool chests with which to supply dealers for holiday trade, ranging from 25 cents to \$266 each, including tools. The boxes are suitable for presents for children, youths and adults who devise many home conveniences which would never be indulged in if a carpenter were to be employed. There are boxes also intended for professional mechanics, stocked with the best makes of tools, with many sizes and assortments of tools to select from, together with 28 styles and sizes of empty tool chests for amateurs, carpenters, machinists, farmers, planters, &c.; also suitable for railroad and mining purposes, leaving the owner free to select his own tools.

### Requests for Catalogues, Price-Lists, &c.

**N.** C. LARSEN, Hardware merchant, of Bellevue, Idaho, has opened a new store at Silver City, Idaho, and advises us that he will

be pleased at that point to receive from the trade copies of catalogues, discount sheets, &c. While the Silver City establishment will receive Mr. Larsen's special attention, the store at Bellevue will also be continued.

Adam Sharp of Sweetwater, Ill., has just opened a new Hardware store at that place, and requests that copies of catalogues and price-lists from manufacturers and jobbers be sent to him.

### Trade Items.

**I**N A SPECIAL NOTICE in this issue Alfred Field & Co., 93 Chambers street, New York, call attention to the fact that for some time past Joseph Rodgers & Sons, for whom they are sole agents in this country, have been annoyed by the fact that Pocket Knives are put on the market with "Rodgers' Pattern" stamped on blades. They are advised that this stamping is an infringement of their rights, and they give notice warning the trade against handling Knives so marked.

AUSTIN & EDDY, manufacturers of special Hardware, whose plant at 115-119 Broad street, Boston, Mass., was damaged by fire October 13 last, advise us that the damage has been to a large extent repaired and the factory is now in running order. General improvements, however, are in progress, which will result in increased capacity.

CHARLES DALY of Schoverling, Daly & Gales has just returned from a flying trip to Europe, began about six weeks ago, he having arrived on the "Paris," November 3.

THE HOLMES & EDWARDS SILVER COMPANY, 2 Maiden lane, New York, have issued a neat pamphlet catalogue of 53 pages, fully illustrated, of the lines of goods they make. On pages six and seven are 13 half size illustrations of their Rialto pattern, recently brought out, now made in Tea, Coffee, Dessert and Table Spoons, Dessert, Medium, Berry and Oyster Forks, Butter Knife, Sugar Shell, Berry, Orange and Five O'Clock Tea Spoons. A full line of flat ware is shown in the following pages. They have added to their line Gold Aluminum Solid Metal Tea, Dessert, Table, Coffee, Orange and Five O'Clock Tea Spoons, Sugar Shells, Dessert and Medium Forks and Butter Knives. This is a new metal of gold color, which will always look the same and can be cleaned as any solid ware. This metal is of 14 karat color and acids will not touch it.

### Circulars, &c.

THE AMERICAN IRON & BOLT COMPANY, Cincinnati, Ohio, with works at Newport, Ky.: Nuts and Bolts. In addition to a full line of Nuts and Bolts the company manufacture Bar and Angle Iron, Wagon Box Iron, Heavy Band, Tire, Horseshoe Iron, Steel Tires, Sheet, Roofing, Tank, Jail and Safe Iron and Boiler Plates. A well printed and conveniently arranged catalogue illustrates the various lines of Nuts and Bolts made by them, and in addition gives *fac-simile* of label for Bolt boxes in colors.

## Hon. Samuel Winslow.

IN OUR ISSUE 25th ult. we published a brief sketch of the career of Samuel Winslow, founder of the Samuel Winslow Skate Mfg. Company of Worcester, Mass., and ex-Mayor of that city. In this issue, in connection with portrait, we give a more detailed account of his business life.

Mr. Winslow was born in Newton, February 28, 1827, and was a descendant of Kevelin Winslow, brother of Governor Edward Winslow of the Massachusetts colony. At the age of 11 years he was obliged to go to work in a shop. His education up to that time had been acquired in the public schools of his native town. He was thoroughly industrious, even at that age. The shop in which he worked was for the manufacture of cotton machinery. He showed great skill and inventive genius, forcing his way to the front so rapidly that at the age of 20 he was foreman of the shop. In addition to contributing his share toward the support of the family, he worked overtime, and earned money which he advanced to two of his brothers, to enable them to pay their way through college and fit themselves for professional careers.

At the age of 21 he held his first public office, being elected in 1848 to the Prudential Committee in the Newton Upper Falls school district. He was soon after elected clerk of the corporation which organized the Boston & Woonsocket division of what is now the New York & New England Railroad. He was also for a number of years a member of the town fire department and several other local organizations.

Before coming to Worcester in 1855 he had gathered together quite a little property, and in that city he formed a partnership with his brother, Seth C. Winslow, and together they started a machine shop, the firm name being C. & S. Winslow.

In 1857 the manufacture of Skates was begun. In this field the Messrs. Winslow were especially successful. The works were first located in the old Merrifield building on Cypress street, and they remained there for 21 years, after which the plant was removed to the new machine shop erected by Mr. Winslow on the corner of Mulberry and Asylum streets, the rapidly increasing business demanding larger facilities.

In 1857 the firm made 25 pairs of Ice Skates, of which 19 pairs were sold. In 1858, anticipating a larger demand, they started in by making 200 pairs,

but before the end of the year had manufactured and sold 2500 pairs. The business thus established increased steadily. In 1871 Seth C. Winslow died, and Samuel Winslow purchased his interest, thereafter conducting the business alone until 1886, when the Samuel Winslow Skate Mfg. Company were incorporated, Mr. Winslow retaining a controlling interest and becoming president and treasurer of the corporation. His son, Col. Samuel E. Winslow, was, however, the active manager of the concern.

Up to 1872 the business had consisted entirely of the manufacture of ice skates. In that year J. L. Plympton, who first brought out the roller skate, but who never made a great success of his invention, employed Mr. Winslow to make skates for him. Some of these

About 50 styles of ice and 15 styles of roller skates are manufactured.

While prominent as an enterprising and successful manufacturer Mr. Winslow was also a conspicuous figure in politics. He was elected Mayor of Worcester for four successive terms, was a member of the Common Council of the city in 1865 and 1866, a representative from Worcester in the General Court in 1873 and 1874 and Alderman of the city in 1885. Mr. Winslow was also a delegate to the National Republican convention at Minneapolis in 1892. In politics Mr. Winslow was a Republican.

Mr. Winslow was also connected with several of the local banks and for the past three years had been prominently identified with the development of suburban street railways. Mr. Wins-

low had been strongly devoted to his home fire-side, and though not adverse to the duties and functions of social life they did not attract him, and he much preferred the happiness and contentment of domestic life. During his lifetime he was a liberal giver to worthy charitable objects, although his charities were never heard of except through the beneficiaries. In his death the city of which he was so conspicuous a business, political and social figure loses one of its most enterprising and public spirited citizens, the esteem in which he was held being indicated by the many tributes paid to his memory.



HON. SAMUEL WINSLOW.

skates were exported to Europe and India. In 1880 Mr. Winslow invented the Vineyard roller skate, the sale of which he energetically pushed. This skate became immensely popular, and Mr. Winslow is referred to as the producer of the roller skating craze which from 1880 to 1885 swept over the country. Hundreds of rinks were built in cities and towns, in many of which Mr. Winslow was financially interested. The demand for Mr. Winslow's skates became so great that for a period of two years his factory was run 23 hours out of the 24. In 1886 the sale of roller skates in this country fell off, but many were and are still manufactured, largely for export to Japan, India and South America. Ice skates are now, however, the principal manufacture of the company, who in the busy season employ from 200 to 300 men, the plant having a capacity of 6000 pairs of skates a day.

York, on January 1, 1894, and that the latter continue to hold it notwithstanding statements to the contrary. They refer to the fact that A. Field & Co. are carrying a large stock of the goods and will be pleased to give prompt attention to inquiries and quote factory prices. The company intimate that every effort will be made by them to maintain the high quality of the Clippers which they are putting on the market.

THE AMERICAN IRON & BOLT COMPANY, with offices at 75 and 77 West Third street, Cincinnati, Ohio, whose advertisement appears elsewhere in this issue, announce to their friends and the trade in general that they have recently purchased the mill and bolt works formerly operated by the late L. M. Dayton, at Newport, Ky., and are now engaged in the manufacture of Bar, Roofing and Stove Pipe Iron, Bridge Rods, Hinges, Bolts, Nuts and Gimlet Pointed Coach Screws. An entirely new catalogue is now ready for distribution to the trade, copies of which will be gladly sent upon application.





specifications. He takes a copy of the specifications in a memorandum book which he carries, as well as the measure-

a memorandum of all the bidders. Then upon arriving at our office he copies both the specifications and measure-

the following words are used in the cost and extensions: worlds fair. 1 2 3 4 5 6 7 8 9 0

Jan 11 1893

Mr. A. P. Adams  
5<sup>th</sup> ave. City

We propose to put on all the Tin & Galv Iron on the T. P. Irwin house complete according to plans and specifications for the sum of One Hundred Seventy Four <sup>28</sup>/<sub>100</sub> Dollars (\$174<sup>28</sup>/<sub>100</sub>)

We propose to put on all the \_\_\_\_\_ on the \_\_\_\_\_ house complete according to plans and specifications for the sum of \_\_\_\_\_ Dollars.

All estimates are contingent upon strikes or unavoidable accidents or delays.

Very Respectfully,  
J. C. STEWART & CO.,  
J. C. Stewart Manager

If you are bidding on any work or in need of anything in our line, let us know and we will be pleased to figure on it, and are sure we can save you money.

Keeping Track of Jobs.—Fig. 2.—Written Bid to Contractors.

J. P. Irwin House	
S. M. Johnson Archt.	A. P. Adams Cont.
Jan 14	All roofs 1 c 14/20 Scotts Ex Coated
	Gutters and Valleys 1 x 10/8
	Main Roof 1191 ft
	Front Porch 192 "
	Back 102 "
	1487 ft.
	Galv. Cond 4 107 "
	Lap Flash 1 28 "
	20" Gutter 104 "
	20" Valley 88 "
	2 Finials
	2 Terminals
	Cresting 5 "
	Contract \$, 14 18
	Jan. 30 1893
	Charged Page 30 15 Day Book

Keeping Track of Jobs.— Fig. 3A.—Record Book—Job Entered.

ments of all tin and galvanized iron work necessary to complete the job as per plans and specifications; he also takes

ments, with a list of the bidders, in the bid book, Fig. 1. The cost and asking price on this job are made the same, and

After the job is written up in the bid book, a written bid, as shown in Fig. 2, is sent to all the bidders. We then have our man keep his eye on the job until it is let to the successful bidder, who we in turn have our representative see, and if we are the lowest bidders on said work or stand in with the contractor, we get the job, which in this case it is taken for granted we did. The contractor represented in my method is A. P. Adams.

We then enter the job in our record book, Fig. 3A, from the bid book, Fig. 1, itemizing only the material and brands specified. At the same time we enter the job complete, precisely as in our bid book, in our foreman's order book, Fig. 4, so that he will know what kind of material to make up. The tinner then go to work and get the material ready to deliver to the job, and any galvanized iron work is turned over to our galvanized iron workers to get ready. The job is thus entered up in every detail, and material ready to be delivered to the job as soon as the word to go ahead and put on the roof is received.

When the word to go ahead is received, we have the material to be put on first delivered to the job, per dray slip in Fig. 5, also showing the time of

delivery, &c. The balance of the material is delivered when needed. The tinner in the mean time have arrived at the building and are ready to work.

All material sent out by the foreman is entered in his charge book, Fig. 6, and marked whether contract or repair work, and if repair work, what the charges are. Each evening the time checks, one of which is shown in Fig. 7, which were given to the men in the morning, are marked O. K. by the foreman, who in turn delivers them to the office together with the charge book already referred to and the credit book, Fig. 8.

Referring to the printed time check, it will be found that each man keeps the time spent on each job, and the time going and coming is charged up to said job. In repair work all material used on said job is itemized on the time check as well as in the charge book. Nothing but the time on contract jobs is posted from the time checks. The other charges coming from the charge book are kept by the foreman.

Each evening the time on contract jobs is posted to the different jobs in the record book to cost of time, Fig. 3B; also all material to cost of material sent out, Fig. 3C, and any credits to cost of materials returned, Fig. 3D.

All repair jobs are posted from the foreman's charge book each evening in the regular day book. The receiving book, Fig. 9, showing everything coming into the shop, is kept by the foreman.

When jobs are complete the tinner working last on said job is supposed to notify the foreman of the fact, or in some cases it is best for the tinner to note it on his time check, Fig. 7A.

The method of keeping a job as explained in the various departments of the record book I think an excellent one. A book is used which, when opened out, measures about 22 inches. The left hand page is divided equally in two parts. The original contract and time are kept on the left hand page, and the material sent out, cost of same, car fare, drayage, &c., and the material returned and cost of same are kept on the right hand page, thus showing the condition of the whole job at a glance. The men's time is figured at the several prices, also the cost of material sent out, including care fare, drayage, &c. Adding these together gives the total cost. Subtracting from this amount the material not used gives the net cost. Subtracting this from the original bid gives the net profit, according to my method. The job is then charged upon the day book at the original contract price, as noted under the contract price, Fig. 3A.

#### Cash Sales.

Referring to the manner in which cash sales are treated I would say: Our office and shop are 100 feet apart. A person comes into the office and wants a piece of tin, zinc, copper or speak-

ing tube, and wishes to pay for the purchase at the time. We give an order on the tin shop, as shown in Fig. 10. When the goods are furnished the same are charged to the office in charge book, Fig. 6. This is necessary in order to keep a complete record of everything going out of the tin shop.

The British steamer "Montezuma" cleared from New Orleans for Liver-

## Selling and Repairing Bicycles.

BY ROSS F. RAINEY.

MANUFACTURERS have, that is a majority of them, come to the conclusion that the retail Hardware dealers are better able to take care of their trade locally than a jobber can who covers a State or part of a

*J. P. Irvine House*  
44 & 46 City

*S. M. Johnson Arch.* *A. P. Adams Cont.*

Specifications

Jan. 10 Cover the entire roof of building and roof of both porches with Scott's Extra coated Tin using 1 c for flat coverings and 2 x for gutters and valleys

All to be put on standing seam and double lashed 14 x 20 tin

Tin to extend over cornice eap.

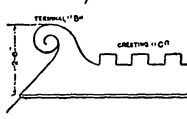
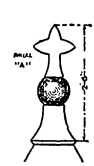
All to be painted one coat underside and two coats outside

All conductors to be 4" Galv. and as shown on plans with shore.

Conductors from porch roof to connect with main.

Finale. Terminals & cresting to be of Galv. Iron as shown on plans

Main Roof	1191 ft.
Front Porch	192 "
Back	102 "
20" Gutter	104 "
20" Valley	88 "
Galv. Cloud 4"	107 "
Lap Flash	28 "
2 Finials "A"	
2 Terminals "B"	
5 ft cresting "C"	

On Contract.

Jan. 16 Ph. Snowden  
own 4's 3rd Ave  
Repair Furnace (put it in first class shape)

17 Chas. Donaghy.  
Article 4's Exchange St  
Repair Spouting } Extra  
and Flash Windows }

Keeping Track of Jobs.—Fig. 4.—Foreman's Order Book.

pool on Saturday with 14,935 bales of cotton, 82,000 bushels of wheat, and other freight. This is claimed to be the largest cargo of cotton ever shipped from any port.

State, at least the retail Hardware dealers of good standing are being given the preference. There are a great many points in favor of having

an agency with a retail Hardware dealer. The time was when only the better class of people could afford to buy a wheel; now the Bicycle is within reach of all, and there are a different class of people now riding wheels.

Possible Customers.

There is the professional, or some-

a wheel himself and letting others try it he gets them interested, and once he gets them interested he can very likely sell them. Next come contractors of all kinds. These people are getting to ride more and more each season, and are learning the advantages of a wheel. The contractors have found Bicycles

Class of Bicycles.

A retail dealer putting in a line of wheels should, as his best wheel, carry a strictly high grade machine—one that is well known and one of the very best kind, that he can guarantee. Here is where the dealer's reputation in the wheel business begins, and he

RECEIVED OF  
J. C. STEWART & CO., By *Jan 16 1893*  
*Tinner*

In Good Order and on  
Credit of *J. P. Brown*  
*44<sup>th</sup> St*  
*City*

*107 59<sup>th</sup> St*  
*104*  
*104*  
*88*

*14<sup>th</sup> St*  
*4<sup>th</sup> St*  
*20<sup>th</sup> St*  
*20<sup>th</sup> St*

*Left shop 1<sup>30</sup>*  
*Arrived back 10<sup>30</sup>*  
*Time of delivery 3 hrs*

Delivered by Driver, *Harry Hamilton*

Received by *James Blair*  
*Tinner*

Sign Your Own Name.

Keeping Track of Jobs.—Fig. 5.—Dray Slip.

times called amateur, who rides for a living. These people the retail dealers cannot sell; in fact no one can sell them. The majority of them ride the wheel of the manufacturer who will

of such a benefit to them that the cost of a new machine at the beginning of the season would at the end of the season more than balance the price he paid for it, taking into account car fare

should maintain it. If he sells an A1 machine for one season, the next season it becomes better known, and so on from season to season, and the time comes when it takes little talking to sell the wheel, except, perhaps, to explain the improvements from time to time. He should also handle a cheaper line of wheels from his high grades, in sizes 24-inch, 26-inch and 28-inch. A good assortment for a Hardware dealer would be \$100 for his strictly high grade machine, then \$75 and \$50, the \$75 and \$50 wheels being 26-inch and 24-inch respectively, the \$100 being 28-inch wheels. This to cover the gents' and boys' wheels. For ladies' wheels would advise \$100 for 28-inch and \$75 for 26-inch wheels. These, six in all, make a fair assortment of samples, good enough for any Hardware dealer.

Display of Bicycles.

The line of wheels should be shown or displayed in the front part of the store, one in the window, where they catch the customer's eye when he first enters. When two friends enter a store on some business other than that of buying a wheel, the fine display attracting their attention, one will be overheard saying to the other: "Say, —, I believe I will get a wheel this season; what do you think?" An attractive display a great many times leads to sales.

Selling a Wheel.

A dealer should at all times give his high grade machine the preference over other wheels he may have; that is,

TIME CHECK.

Date *Jan 21* 189*3*

Name *James Blair*

Name of Job, and Material put on.

*J. P. Brown*  
*44<sup>th</sup> St*  
*Russell on*  
*Ironials Trusting*  
*Flashing & C*  
*Completed this*  
*day*  
*OK Adams*  
*Foruman*

TIME.

*9*

Keeping Track of Jobs.—Fig. 7.—Time Check.

do the best by them. Next comes the pleasure rider, who only rides his wheel to and from work and in the evening merely for the pleasure and recreation there is in it; here are the parties with whom the dealer does a great deal of his business. The dealer very likely has a great many friends who never rode a wheel, and by riding

and other expenses that he would otherwise be subjected to. This is a time of progress in the Bicycle business. The jobbers, dealers, business men, contractors and all parties in general are taking advantage of the benefits offered and are riding wheels. The ladies, too, are getting right in line with the men.

1893		
Jan 16	J. P. Irons & Co 44 <sup>th</sup> St. J. P. Adams Cont	
	1075 ft 1 c 14/20 Scotts Ex Rod	Contract
	104 " 4 " Galv. Cond.	
	104 " 20 " Butters	
	88 " 20 " Valley	
	Carfare 30'	30
	Phs Snowden	
	From Hs 3 <sup>rd</sup> Ave	
	Repairing Furnace 4 hrs	50 2.00
	1 Pc sheet iron 10 x 22	20
	1 Bolt	10
	Office	
	1 Pc Zinc	25
	1 foot stove pipe	25
17	J. P. Irons & Co 44 <sup>th</sup> St. A. P. Adams Cont.	
	568 ft 1 c 14/20 Scotts Ex Rod	Contract
	25 ft 1" Cap flash	
	2 Furnace	
	2 Terminals	
	5 ft Rusting	
	Carfare 30'	30
	1 horse wagon & Driver 3 hrs 40'	120
	Chas. Donaghy	
	Astel Hs Exchange St.	
	Repairing spouting, Flashing Window	125
18	J. P. Irons & Co Carfare	50

Keeping Track of Jobs.—Fig. 6.—Charge Book.

he should always talk his best machine up first, then, if his customer does not want a high priced machine, show him the next grade machine, explaining the wheels in detail, giving all the desirable points in the different makes and comparing one wheel with another. Of course the high grade wheel has more points in its construction than the next wheel, therefore comparing the two wheels often leads the customer to purchase the high grade machine. The more high grade machines a dealer sells the more it will lead to selling, and the better the reputation he will get.

The Bicycle Department.

If the proprietor is not well posted in the Bicycle business, and does not care to pay a man a high salary to conduct that department, it would be advisable for him to give one of his clerks full charge of it. Let him study the wheel sold in every detail, assist him in securing the trade papers on the subject, allowing him to attend the Bicycle

meets and shows in the town or vicinity. A salesman showing a wheel should be pleasant and agreeable, and well posted in every detail. In explaining the wheel he should not run down any other make, but explain to the customer all the favorable points in his wheel from beginning to end, and if the customer wants a wheel he can tell whether he wants the one that is being shown. A clerk should not wait from time to time for a customer to ask questions—in fact, some customers know very little about the good points about a wheel; all they know is that they want a good wheel. Then tell him all you know, and after explaining the wheel from front to rear you can size your man up and the chances are he will buy.

A Disgusted Merchant.

Now take the other side of the subject. A dealer puts in a similar line of wheels; he is not posted in the business, does not ride a wheel, none of his clerks are posted, nor do they ride. The dealer thinks: "Well, my competitor is putting in a line and I will have to do the same thing or take a back seat." At the same time he wishes to have as little expense connected with it as possible. Things go along fairly well for a while. He sells a few wheels. Then a well posted wheelman comes in and asks to see their high grade machine, asks questions in regard to its make up, what kind of a tire it has, could you put on another tire if he wanted it, what is the weight with wood rims, and numerous other questions. Some of the questions the salesman can answer, others he cannot. Then he becomes embarrassed and contradicts himself time and again without knowing it. The result is the wheelman goes out disgusted, and very likely will never come back. This will hurt a dealer's reputation more than anything else. After this the wheels sell slowly, the dealer gets disgusted, with a fair stock on hand, and wishes he had never seen a wheel. The fact is he does not conduct the business

1893		
Jan 20	J. P. Irons & Co A. P. Adams Cont	
	21 ft 1 c 14/20 Scotts Ex Rod	Contract no credit
	5 " 4 " Galv. Cond.	
" 21	John Henderson Drain Hs 12 <sup>th</sup> St.	
	10 ft 20 " Valley 1 x 0.5.	15 1.50
"	P. N. James From Hs Mulcaud Ave.	
	10 Pcs 7 x 10 Flashing	40
	4 ft 3 " Galv. Cond.	40

Keeping Track of Jobs.—Fig. 8.—Credit Book.

right. The moral to this is: If you intend going into the wheel business have one man who understands his business well. It is a great benefit to have one clerk a rider, or all, for that matter. The more riders the more wheels sold and the better and sooner

It Is Reported—

Alabama.

That H. J. Hallack, Tinware, Stoves, &c., GADSDEN, has gone out of business.

That G. O. Warren has succeeded D. E. Crocker in the Stove, Tinware

That P. Walsh has just entered the Stove and Tinware business at BIRMINGHAM.  
That R. A. Posey, Hardware merchant, of DADEVILLE, has completed his new brick building and taken possession of it.  
That Eubank & Clark, Hardware merchants, PIEDMONT, are adding Stoves to their assortment of goods.  
That a new Tinware store has been opened at UTAH by Thomas Carrington.  
That John P. Streety & Co. have opened a new Hardware store at HANEYVILLE.

Jan 16	1075 ft 1c 14 1/2	Scotts	D+r	D+r	FD
	107 " 4"	Galv Crod	a	a	DS
17	Carfare				30
	4 1/2 ft 1c "	Scotts	D+r	OR	SR
	28 " 1c	Cap flash.		W	WR
2	Truials		R+RR	S	AR
2	Terminals		WDR	R+RR	
5	ft. Bresting		WD		FD
	Carfare				30
1	House Wagon, Drive 3 hrs 40'				1 20
	104 ft 20" gutter		WR+	WR+	DO
	88 " 20" Valley		WR+	WW	22
18	Carfare				50
Cost of material alord to Building					121 02

Keeping Track of Jobs.—Fig. 2C.—Record Book—Cost of Material Sent Out.

they get introduced, as one wheel introduces another.

**Repair Shop.**  
A Hardware dealer may not understand the Bicycle business. If such is the case it would be advisable to get a competent man to take full charge of both the selling and the repairing. It is a well-known fact that a great deal of money is made by repairing, and no doubt in a good locality it would pay to have a repair department. Of course, the business done would have some bearing on whether it would be profitable or not. Very few of the small retail stores would care to attach a repair shop to their business, owing to the expense connected with it. In the Hardware store in which the writer is employed there is a large tin and galvanized iron works. Therefore, when the repair man has nothing to do in his line there is always something else for him to do in the shop, and he is always busy whether repairing Bicycles or doing tin work.

**System in the Shop.**  
All goods received should be tagged with the owner's name and the repairs required before they enter the shop. If the wheel can be repaired in the shop it should be done at the repair man's earliest convenience, and collections should invariably be made for the work on delivery. If the wheel has to have a new part then the wheel should be laid away until the new part comes. In the retail Hardware store the repairing would not be so large as to require a perfect system to run it.

Jan 16	James Blair	4	25	1 00
	Narry Huston	9	15	1 35
	Ch. Jones	9	30	2 70
17	James Blair	9	25	2 25
	Narry Huston	9	15	1 35
	Ch. Jones	9	30	2 70
18	James Blair	8	25	2 00
	Narry Huston	3	15	45
	Ch. Jones	9	30	2 70
	Ch. Mitchell	9	25	2 25
	Simone	9	15	1 35
21	James Blair	8	25	2 00
	Narry Huston	9	75	6 35
	Ch. Jones	9	30	2 70
	Chas. Mitchell	9	25	2 25
Cost of time				19 15

Keeping Track of Jobs.—Fig. 3B.—Record Book—Cost of Time.

and House Furnishing Goods business at NEW DECATUR.  
That Mayberry & Watson Company are a new Hardware concern at BIRMINGHAM.  
style of R. D. Hawley & Co., on November 1 changed the firm name to Cadwell & Jones.  
**Illinois.**  
That O. Guillemont, formerly a



traveling salesman for Hibbard, Spencer, Bartlett & Co. of CHICAGO, has purchased a stock of Hardware at EL PASO, where he will open a new store.

That David Stiver will open a new store at STOCKTON.

That O. A. Harrison, Hardware and Implements, LOVINGTON, has sold out.

#### Idaho.

That N. C. Larsen of BELLVUE has opened a new store at SILVER CITY.

#### Indiana.

That Hatfield & are Read a new firm

traveling salesman in the employ of the Simmons Hardware Company of St. LOUIS. Mr. Scott is a well-known local business man.

That R. A. Callender has sold out his Hardware business at GLENCOE.

#### Michigan.

That the Menominee Hardware Company of MENOMINEE will soon commence the erection of a warehouse 100 x 25 feet.

That A. Whitney & Son, Hardware dealers of QUINCY have been awarded the contract for putting in the water works at UNION CITY, to cost \$19,000.

has removed to PLAINVIEW, where he has purchased a Hardware store.

#### Mississippi.

That Thomas Goodwin has retired from the Goodwin Hardware Company of WATER VALLEY.

#### Missouri.

That Thomas B. Crow is closing out his Hardware business at NEW MADRID.

#### New Hampshire.

That the large Stove store of C. M. Bailey, at ROCHESTER, was robbed on the 25th ult.

#### New Jersey.

That F. A. Marvin will soon retire from the Hardware business at PERTH AMBOY.

#### New York.

That Mrs. H. M. Bodine is closing out her Hardware business, at 2192 Fulton street, BROOKLYN.

#### Ohio.

That the Hardware firm of Dunam, Kayser & Co., St. MARY'S, were dissolved on November 1. Lewis Kayser and Otis E. Dunam have retired from the business, which will be hereafter conducted by W. R. Dunam and Henry Coker.

#### Pennsylvania.

That S. P. Fenn is building a brick addition to his Hardware store at PITTSBURGH.

That the Hardware firm of Phillips & Etherington, 2936 Market street, PHILADELPHIA, were dissolved by mutual consent on November 1. The business will be continued by Harry A. Phillips and George J. Maisch, under the style of Phillips & Maisch.

That William Feltz & Son have recently opened a new Hardware store at YORK.

That S. S. Bryan, Hardware mer-

Order No. .... This No. must appear on Bill.  
Give No Goods Without a Written Order.

Office of **J. C. STEWART & CO.**

M. *Tinshop* Jan 15 1894

Please deliver to *dealer*

*1 Re Jine 250 } paid*  
*1 Jainsboro Pipe 25 }*

*chargato officia*

**J. C. STEWART & CO.,**

Per *Rosa*

Keeping Track of Jobs.—Fig. 10.—Order Slip on Tin Shop.

at WASHINGTON. They will embark in the Hardware and building material business about December 1. Mr. Hatfield was formerly a member of the firm of Hatfield & Palmer, who were succeeded by J. A. Palmer & Son. The new firm expect to open up a stock of about \$10,000.

#### Iowa.

That P. M. Jenks has bought the Hardware and Implement stock formerly owned by W. C. Gerner, BARNUM. Mr. Jenks was formerly an employee of Mr. Gerner.

That Isaac Odell has disposed of his Hardware business at GILMORE.

That C. E. Danforth & Co. of HAMBURG have sold out their stock of Hardware to F. Toedt.

That the Foster, Bailey & Goodrich Company of GRINNELL have decided to add Hardware to the other lines they are handling.

That C. H. Thomas & Bro., will succeed Thomas & Dougherty in the Hardware business, at CRESTON, about January 1, 1895, E. N. Dougherty having sold his interest in the concern to G. M. Thomas.

That Smith & Sanders, Implement merchants, SOUTH ENGLISH, have sold out to Cheney & Sanders.

#### Kansas.

That the Union Hardware Company of ARKANSAS CITY have been organized with a capital of \$5000. The directors are J. G. Finley, J. S. Short, R. J. Rankin, S. H. Hamilton and Robert Godson.

That D. C. Kennedy, Hardware dealer, ANDOVER, has sold out.

#### Kentucky.

That the Hardware store of John T. Miller, at LEXINGTON, has been sold to J. Frank Vanderen and J. Scott. Mr. Miller has conducted the store for the past 42 years with conspicuous success and has retired from active business. Mr. Vanderen, one of his successors, has for the past eight years been a

Jan 3	James B Scott & Co	10 Bils 10 1/2 Ex Coated
5	Austin Odayke & Co	500 ft 2" Lead.
		1000 " 3"
		200 " 4"
		25 Dry Fast 22 for Druck & Wood
6	E. A. Williams & Son	1000 1/2 x 1/2 solder
		1500 " Refined
	Apollo Iron & Steel Co	5 Bales #20 Galv Sheet Iron
		140-146-150-145-140
7	Allen & Co.	12 Pcs Tinner Snips

Keeping Track of Jobs.—Fig. 9.—Receiving Book.

That Frank S. Bagg will soon embark in the Hardware business at PORT HURON.

#### Minnesota.

That S. A. Anderson will soon open a new Hardware store at DAWSON.

That the Hardware firm of Clark & Srsen of OWATONNA have been dissolved. J. T. Clark will continue the business under his own name.

That R. W. Rockwell of PRESTON

chant, at TITUSVILLE, has doubled the size of his store by adding the room adjoining his establishment, so that his emporium now measures 45 x 115 feet. Mr. Bryan intends to carry an increased line of House Furnishing Goods and conduct business on a more comfortable basis than heretofore.

#### South Dakota.

That J. A. Rose has sold his Hardware store at PIERRE to the Pierre

Mercantile Company, recently organized.  
That A. C. Witte's Hardware store at ABERDEEN was burglarized on the 22d ult. About \$100 worth of goods were taken.

Tennessee.

That W. F. McDaniel & Co., dealers in Hardware, groceries and drugs, SOUTH PITTSBURG, have sold their drug business to C. L. Ingersoll.

quently necessitates a considerable range of prices.

White Lead.—Only moderate orders have been placed for dry Lead and prices stand just about the same as they have been for several weeks. The contest between the independent and the combined corrodors is by no means dead, neither is the opposition that comes from producers of inferior prod-

but cheapness seems to have little attraction, and business is almost wholly of routine type. Prices range all the way from 5¢ up to 6¢, according to brand and size of lot.

Litharge.—There has been some improvement in sales of the lower grades, but dealings are smaller than usual at this season of the year, and almost invariably at low prices where round lots are involved. Dealings were chiefly at prices on the basis of 4½¢ for both domestic and foreign. High grades have undergone no change in price, but are meeting with very moderate sale.

Orange Mineral.—Quite a good business has been done in foreign for future delivery, at very low prices. The sales were chiefly at 6½¢ @ 6¾¢ for German makes in round lots. Higher grades, while selling in a moderate way only, are relatively firmer at 8½¢ @ 8¾¢. Domestic is unchanged in price and selling slowly.

Zincs.—The market is quiet and wholly bare of new feature. Deliveries of domestic brands on former contracts are liberal, but not up to the average for this season of the year. New purchases are moderate in the extreme, although specially low prices have been made to induce business.

Colors, &c.—No new features have developed in the market for either Dry or Oil Colors. Business has proceeded in about the usual way, and, while on a low level, prices have undergone no decided change. Mixed Paints have been selling well, but not to a sufficient extent to have any decided influence upon values. In fact, the market is quite as

Jan 20	27 ft 1c 14/10 Scotts Ex. dld	DR	WR	2D
	5 - 4 - Galv. Cond			LR
	Cost of material unnecessary to complete job			175
	Original Bid			174 78
	Cost of material alid to job	121	02	
	Cost of putting on material	29	15	
		150	17	
	Less cost of material unnecessary to complete job.			175
		148	42	
	Profit on Iron and Steel 44 ¢ 1¢	26	36	
		174	78	174 78

Keeping Track of Jobs.— Fig. 3D.—Record Book—Cost of Material Returned.

Virginia.

That M. M. Morriss, formerly senior partner in the Morriss Implement Company of GLADE SPRING has been chosen cashier of the bank of GLADE SPRING which was organized a short time since.

That the Bedford Hardware Company, BEDFORD, have been organized. Their store was opened on November 1, with R. H. Thomas as manager.

That Dame & Francis, Stoves, &c., SALEM, have been succeeded by J. T. Dame.

Washington.

That the Atkinson-Calhoun Company have been organized at BLACK DIAMOND. The incorporators are J. M. E. Atkinson, Isaac P. Calhoun and Francis J. Burns. The company's capital is \$20,000.

West Virginia.

That Kaue & Keyser is the style of a new Hardware firm at WEST UNION. The firm have put in a \$2500 stock in a building recently erected.

Wisconsin.

That A. W. Vaughan has opened a new Hardware store at LODI.

That an explosion of 6 tons of dynamite occurred in the powder house of J. R. Sharp, a Hardware merchant of CHIPPEWA FALLS, on the 28th ult. The building was a wooden frame structure covered with heavy sheet iron and was 20 feet square. The shock of the explosion was heard 20 miles away.

The Hardware trade throughout the country are requested to report business changes, improvements and other matters of trade interest suitable for mention in this department.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods fre-

uct. Business has been done at 4¢ @ 4½¢ in a wholesale way and at 4½¢ @ 4¾¢ in moderate quantities. Lead in Oil has met with quite good sale, but there is still considerable irregularity in prices and the market is quite as unsteady as it has been during the past month or six weeks. This is partly due to home competition, but it is a plain fact that offers of foreign brands have more or less depressing influence. Upon the whole it looks very much like a buyers' market for the time being.

Red Lead.—Little more than routine business has been done. There is enough foreign competition to keep prices low,

flat as it has been at any time during the past two months.

Oils and Turpentine.

Linseed Oil.—Speculative influence has kept the market for raw material in a more or less unsettled condition; but up to the present time crushers have not been sufficiently influenced to make any new departure. In fact, the general tendency is to keep the prices as high as foreign competition will admit. At the moment offers of English Raw Oil at less than 58¢ are the exception. Domestic product may be secured at 56¢, with usual allowance for package.

Cottonseed Oils.—A somewhat ir-

TIME CHECK.	
Date Jan 16 1895	
Name James Blair	
Name of Job, and Material put on.	TIME.
	H. M.
J. R. R. v. n. s. s.	
144 ¢ 21	
Putting on main roof	24
Ph. Snowden s. s.	
3rd ave	
Repairing Furnace	14
1 Reshaanson 10222 1dols	
Shop work	19
OK by	
Adams Foreman	

Keeping Track of Jobs.—Fig. 7A.—Time Check.

regular market has been experienced. The force of circumstances has served to keep prices low. Efforts in speculative direction to carry them upward have been made with very indifferent result. On the spot there were sales of prime Summer Yellow at 28¢ @ 29¢, and prime crude went at 24¢ @ 25¢. Corresponding prices were accepted for other grades.

**Lard Oil.**—Sales of prime have been made at as low as 55¢ for prime city brands, and quotations above 56¢ are the exception at the present time. This revision of price has led to somewhat freer buying on both home trade and export account, but the supply is still excessive and the market has a weakish appearance.

**Fish Oils.**—There is no change whatever in the condition of crude Sperm Whale or Menhaden Oils in this market, and none is reported from other quarters. In the manufactured Oils there is a fair business, chiefly at about former prices.

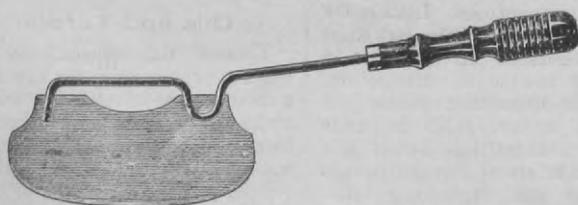
**Miscellaneous.**—Common Olive Oil in barrels has been selling at as low as 55¢ on the spot, and purchases could probably be duplicated at that price. Coconut Oils have been selling in a moderate way only, and, while not positively lower, prices still tend more or less in buyers' favor.

**Spirits Turpentine.**—Little change has taken place during the past week. Prices have ranged within the limits of 28½¢ @ 29¢. Speculative interest is not nearly as lively as it was a week or two ago. The trade demand is also light, and the market is at present showing extremely quiet tone.

**A Warning to Exporters to Mexico.**—Manufacturers who are anxious to cultivate an export trade with Mexico should be warned against a new dodge to raise money from which a number of our readers have suffered lately. The scheme is to secure a contract on a commission basis for handling goods in the Mexican market. It is plausibly presented, backed with an apparently accurate knowledge of the country and its needs. The principal proof of good faith, however, is the presentation of a number of *bona fide* contracts previously secured from other firms. After the business is settled, a small sum is asked for to defray cost of translating into Spanish advertising matter and circulars. Those of the firms who have been heard from report that no business has resulted, so that it looks as though the sole aim is to gather the small amounts in the manner referred to.

#### Family Cleaver.

The cut herewith shown represents a family cleaver, put on the market by Mason & Parker, Winchendon, Mass.

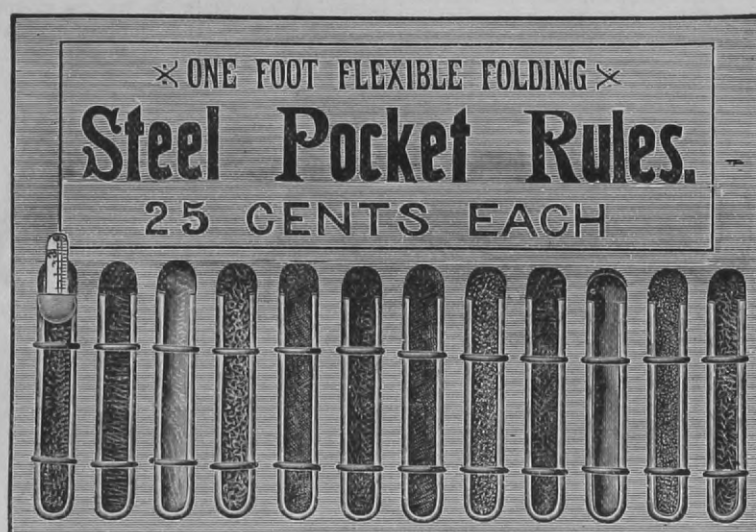


Family Cleaver.

The cleaver is described as being made entirely of steel except the handle, which is wood, cherry finished. The

blade is 6 inches long and of extra heavy stock, riveted to the shank, which is 14 inches long. The tang or handle bar passes completely through the handle, to which it is securely riveted.

inch joints, three fold, put up in metal bound embossed leather cases of assorted colors. The manufacturers state that the rules are light, compact, convenient, durable, suitable to carry in



The Lufkin Display Rule Card.

The manufacturers state that the workmanship and finish of the cleavers is first class, and that they are packed 1 dozen in a box.

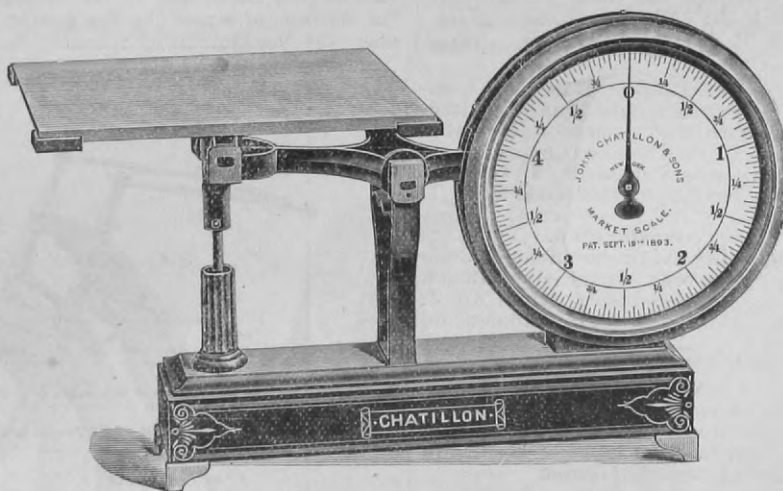
#### The Lufkin Display Rule Card.

The Lufkin Rule Company, Saginaw, Mich., are offering their 1-foot flexible steel folding pocket rules, on cards, as

the vest pocket, and that they are ready sellers. The company will send a sample card of rules at the regular trade price of \$2 per dozen, with 12 cents for postage.

#### Even Balance Market Scale.

John Chatillon & Sons, 85-93 Cliff street, New York, have just put on the



Market Scale with Agate Bearings.

shown in the accompanying illustration. The card is designed as a neat display card to set on the counter or showcase,

market an even balance scale, as here shown. This is introduced as an exceptionally sensitive counter scale, designed largely for market uses. One of its prime characteristics consists in its being fitted with agate bearings, as fine watches are ruby jeweled, to reduce friction and minimize wear. The double dial is 8 inches in diameter, with 10-inch nickeled sash, and so arranged that the pointer can be seen equally well by both buyer and seller. The scale has a marble plate 11 inches square, the extreme length of the scale being 23 inches. The body of the scale is finished in maroon and decorated. The scale can be obtained with dials indicating 5, 10, 20 and 40 pounds at one revolution, by ½, 1, 2 and 4 ounces respectively, at a uniform price.

to increase sales; each card containing one dozen rules. The rules are made of spring steel, No. 28 gauge, with 4-

**Motor Cycles.**

The Motor bicycle, shown in Fig. 1, and the Victoria cycle, shown in Fig. 2, are being introduced by the Motor Cycle Company, Cleveland, Ohio. The driving mechanism of the former con-

It is an impossibility to run the machine until the passenger has taken his position in the saddle. The speed is varied at will by turning the throttle valve, and the machine stopped by closing the valve.

Considered as a whole, the bicycle is designed and constructed with a

gines will outlast the best make of bicycles.

The Victoria Motor cycle was built to supply a demand which a two-wheeled machine would not reach, and to take the place of a horse and carriage, seating two or three persons, side by side.

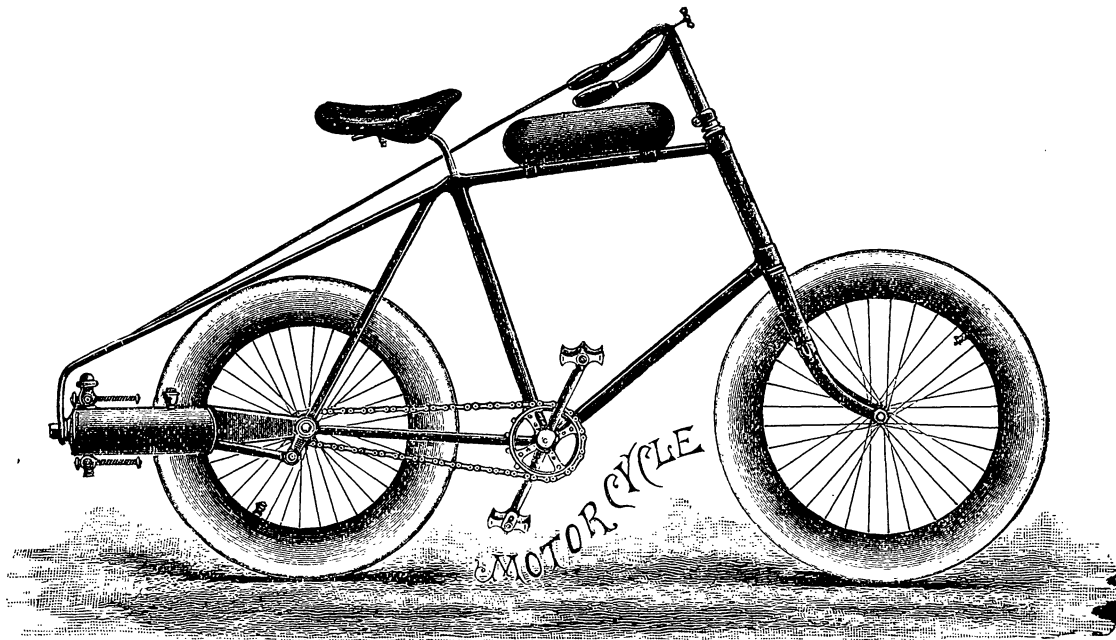


Fig. 1.—Motor Bicycle.

sists of two hot air engines—one on either side of the rear wheel—the crank connection being clearly indicated in the engraving, and the general arrangement being similar to a locomotive. The can in front of the operator carries the oil, which is conveyed through the frame of the machine to the cylinders of the engines, where it is mixed with air. Being

view to making it unusually strong and adapted to meet the requirements of all classes of riders and convenient to operate. The front wheels are 24 inches in diameter and the rear ones 22 inches, with 4-inch pneumatic tires, having a non-puncturing strip between the inner and outer cover. The surface presented to the ground when the machine is in operation is

The machine is low and easily entered. The machine is easily controlled, and any person of ordinary intelligence can run it. There is no expense except when in actual use, and which is but a few cents per day. Each machine is guaranteed by the manufacturers for one year. Arrangements are being made for space at the New York and Chicago bicycle exhibits, where it is understood

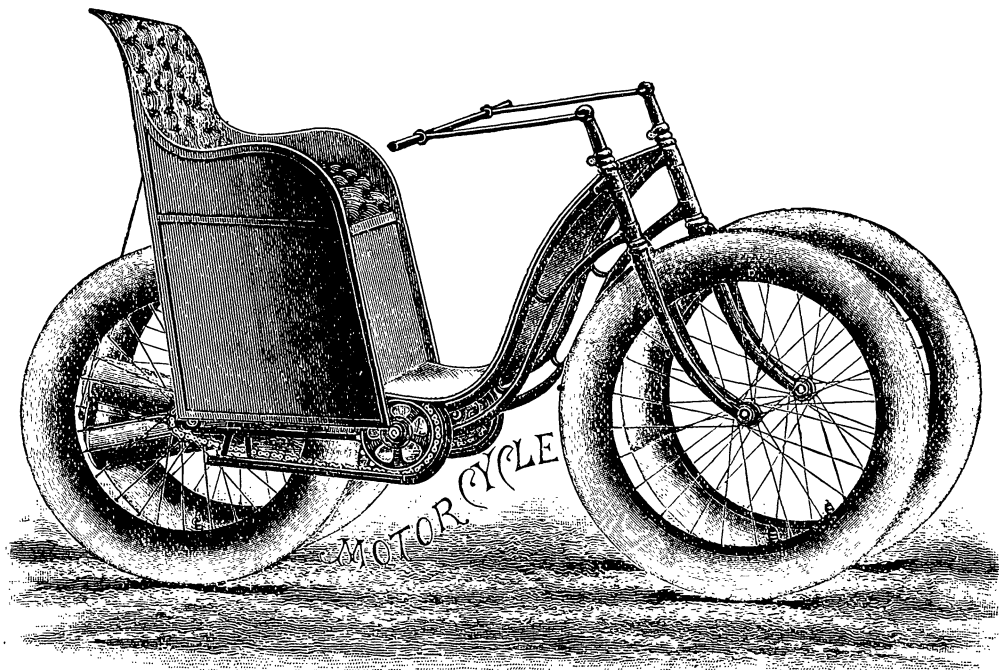


Fig. 2.—Victoria Motor Cycle.

ignited it expands the air and forces the pistons forward. Ordinarily, in engines of this type, a fly wheel is necessary to equal the load; in this case the passenger takes the place of the fly wheel, or, in other words, the velocity of the cycle and the passenger combined pull the engines over the center and compress the charge behind the piston.

about 5 inches in width, giving surface sufficient so that the machine can be ridden over mud, sand, dust, and over rough roads. It may be propelled by foot power if desired. The manufacturers claim that the machine may be run at any speed from 1 to 30 miles an hour, that it will climb hills, run against heavy winds, and that the en-

there will be machines, so that any one wishing to try them may do so.

Thomas Ellison, the well-known statistician of Liverpool is of the opinion that prices have certainly reached bottom the world over, and that their increase from now on will be sure and gradual.



### A New Wrought Padlock.

A padlock which presents several points of novelty has been placed upon

locked readily by pressing the two sides of the ring together. The internal mechanism is entirely of brass, operated by flat steel keys, the locks being 24 keyed and all different in a dozen. The

the parts of the rifle is described as follows by the manufacturers :

"The breech bolt, worked by a finger lever, is automatically locked by a vertically moving block, which shows on

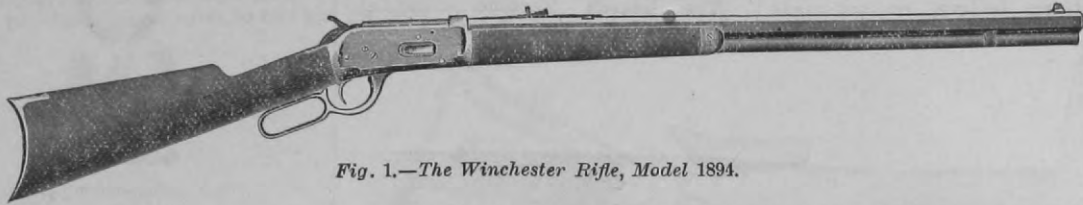


Fig. 1.—The Winchester Rifle, Model 1894.

the market by the Yale & Towne Mfg. Company, Stamford, Conn., and 84-86 Chambers street, New York, as shown

steel shell locks are made with brass shackles to avoid the possibility of rusting, and the workmanship and finish

the top of the gun when closed, and covers the whole rear of the breech bolt; the firing pin is automatically

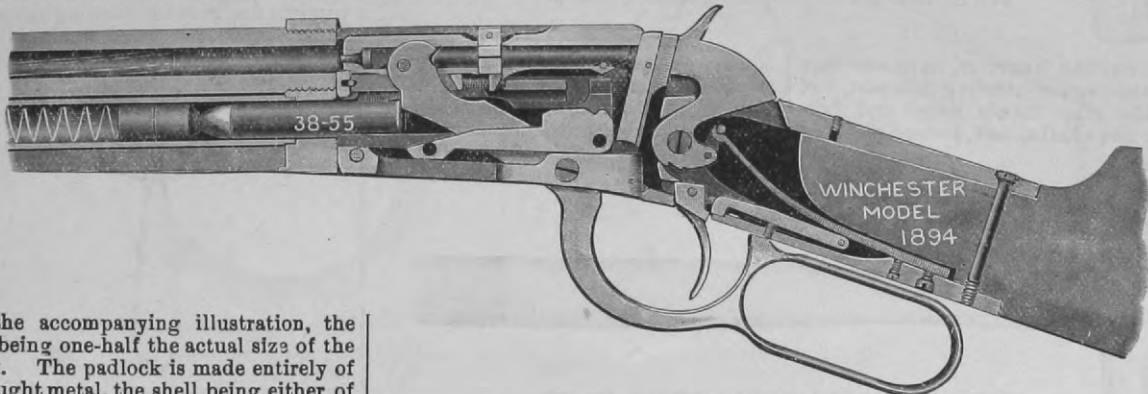


Fig. 2.—The Interior of Winchester 1894 Model.

in the accompanying illustration, the cut being one-half the actual size of the lock. The padlock is made entirely of wrought metal, the shell being either of brass or steel, while the shackle and all the working parts are of brass, both for the brass and for the steel shell locks. The shell is rectangular in shape, 1 inch wide by  $1\frac{1}{2}$  long, the shackle forming

are described as being excellent. The padlock is intended to meet the requirements of the market for a thoroughly

withdrawn and the trigger locked until the parts are in firing position, while a heavy hammer and a strong mainspring

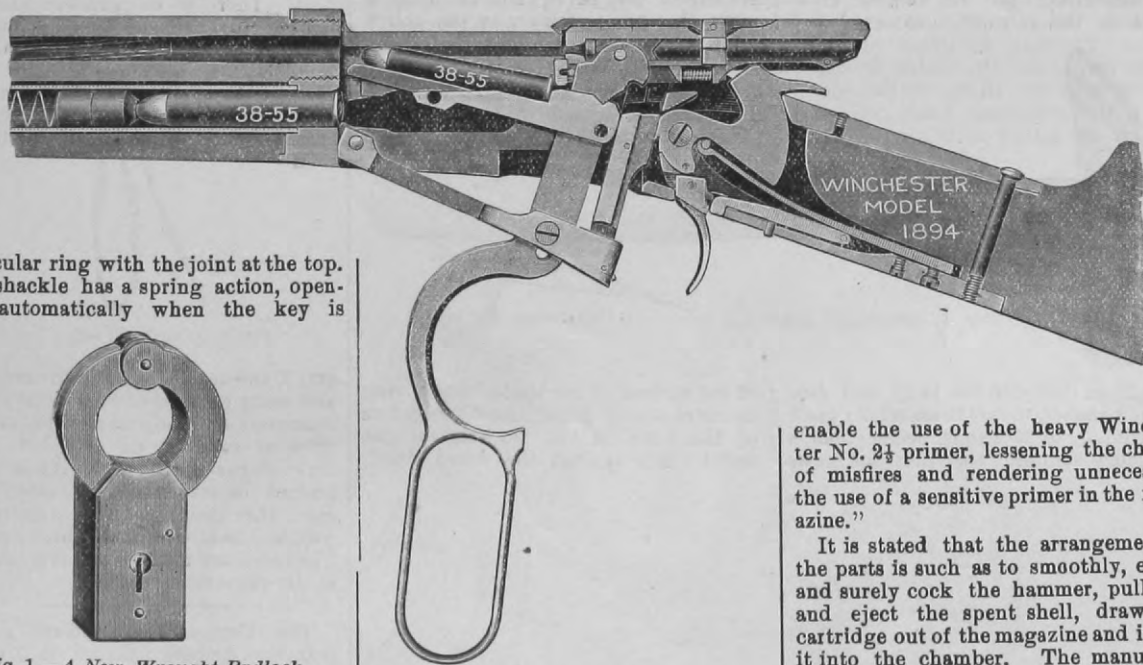


Fig. 3.—Working of Winchester 1894 Model.

a circular ring with the joint at the top. The shackle has a spring action, opening automatically when the key is



Fig. 1.—A New Wrought Padlock.

turned, and being self locking when closed. It is explained that the position of the joint makes the form of



Fig. 2.—Key for Wrought Padlock.

shackle very convenient, the opening being in the side, rendering the lock easy of removal from the staple when unlocked, and also enabling it to be

well made wrought padlock, which, while possessing a high degree of security and convenience, can also be offered at a moderate price.

### The Winchester Rifle, Model 1894.

Winchester Repeating Arms Company, New Haven, Conn., and 312 Broadway, N. Y., are offering the latest Winchester rifle, as shown in the accompanying cuts. The operation of

enable the use of the heavy Winchester No. 2 $\frac{1}{2}$  primer, lessening the chance of misfires and rendering unnecessary the use of a sensitive primer in the magazine."

It is stated that the arrangement of the parts is such as to smoothly, easily and surely cock the hammer, pull out and eject the spent shell, draw the cartridge out of the magazine and insert it into the chamber. The manufacturers remark that the material is made especially to their order and is the best that large experience and buying capacity can produce, while the workmanship is the same as characterizes the rest of their product. The rifle will be adapted to the .32-40 and .38-55 cartridges. The length of the barrel is 26 inches, furnished round and octagon; the gun weighing from 7 $\frac{1}{2}$  to 7 $\frac{3}{4}$  pounds, varying slightly according to the bore and shape of the barrel. It is explained that a 26 inch magazine will hold nine cartridges, which, with one in the barrel, gives a total of ten shots at the command of the shooter. The manufacturers state that take down rifles in this model will be ready in a very short time.



Riveting and Farriers' Hammers.

The David Maydole Hammer Company, Norwich, N. Y., are introducing new styles of hammers, among which are those shown in the accompanying cuts. These hammers, the manufacturers believe, are not made elsewhere. It is explained that the double

styles in six sizes, from 3 ounces to 1 pound 10 ounces. The farriers' hammer is made in three sizes, from 9 to 15 ounces. .

Barrett's Bevel Square.

The Leavitt Machine Company, Orange, Mass., are offering a bevel

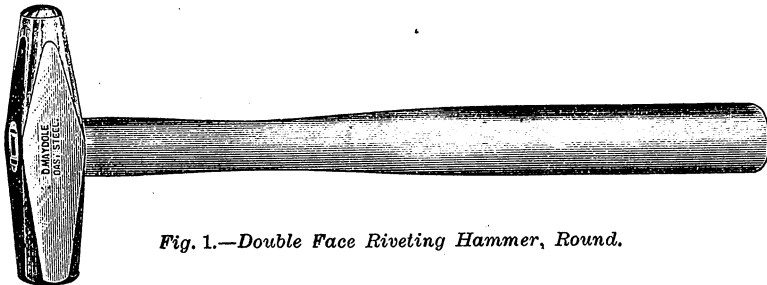


Fig. 1.—Double Face Riveting Hammer, Round.

faced riveting hammers, have one face like the regular riveting hammer, but that the other face is round and full, much like a half sphere, instead of being

square, as shown herewith. The wood portion of the bevel is made of cocobola, brass trimmed and well finished. The arrangement of the adjusting screw

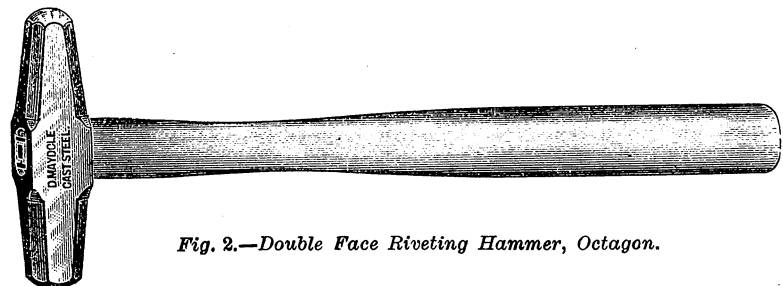


Fig. 2.—Double Face Riveting Hammer, Octagon.

wedge shaped, as in the old style, and, therefore, is a superior tool for nearly all kinds of riveting. The manufacturers point out that the weight of the claws in the farriers' hammer, being

does away with the necessity of a thumb screw on the side of the bevel. The adjusting screw is worked from the end of the bevel, and the point is made that the clutch covers two-thirds

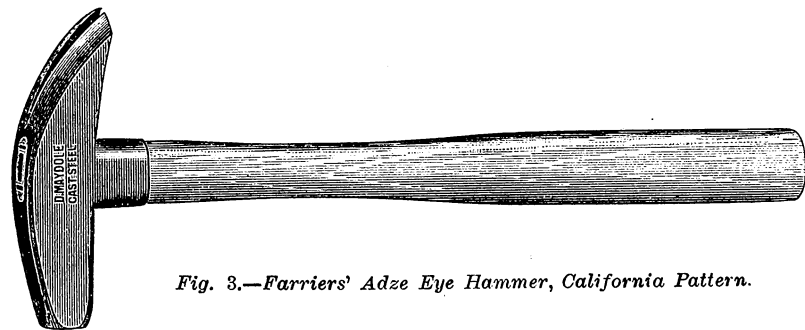


Fig. 3.—Farriers' Adze Eye Hammer, California Pattern.

directly in line with the body and face of the hammer, makes it especially good for driving, as it hangs better than a bent claw hammer; also that the claws

of the surface of the blade, thus giving an extra strong grip. Another feature of the bevel is the working of the metal blade against the wood stock,

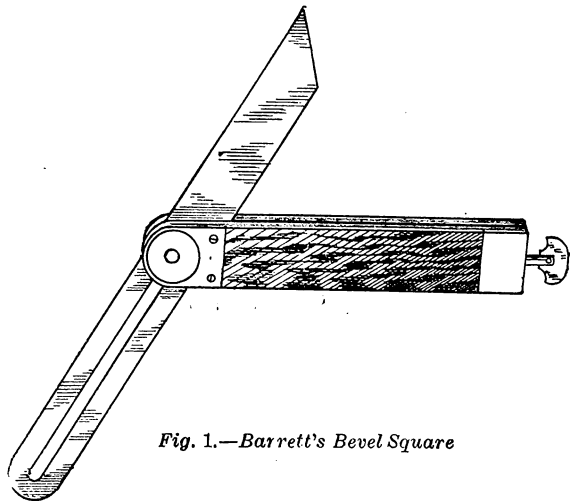


Fig. 1.—Barrett's Bevel Square

are strong, sharp and that the split in them narrows near the hammer's eye. The riveting hammers are made in both

which, it is explained, creates more friction than when both surfaces are metal.

McGill's Clasps and Carding Loops.

Holmes, Booth & Haydens, 37 Park place, New York, in addition to the fasteners previously described, are of-



Fig. 1.—Suspending Clasp.

ering clasps and carding loops, as here shown. The suspending clasp, illustrated in Fig. 1, is one of a variety of patterns designed for hanging cards, calendars, prints, &c. The fastening shanks



Fig. 2.—Wire Carding Loop.

are a part of the clasp, the whole being made of jewelers' metal of first quality and finish. The carding loops are made for wire and cord, as shown in Figs. 2



Fig. 3.—Cord Carding Loop.

and 3, and are adapted for the mounting and ready removal of articles of varying diameters on showcards. In use the wire or cord of the loop is passed through the card from its back, passed around the article to be mounted on the card, then brought back through the card and wound around the loop head. The loops are made of the same material as the suspending clasps.

The German Government declares that the embargo placed on American

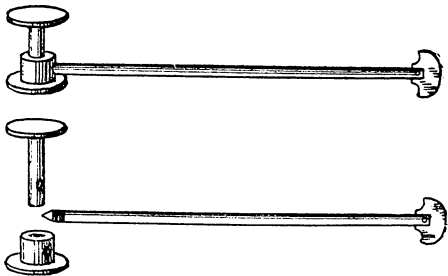


Fig. 2.—Detail Views of Adjusting Screws.

cattle is purely sanitary and not retaliatory in any sense.

**Combination Heater and Cook Stove.**

Edward Miller & Co., 10 and 12 College place, New York, are introducing

heater is designed for oil, having a font with a capacity of 4 quarts, to burn 12 hours. The extreme height as a heater, with the drum, shown in Fig. 2 in posi-



Fig. 1.—Miller Oil Heater and Cooker.



Fig. 2.—Sheet Iron Drum for Heater.

their Combination heater and cook stove, as shown in Figs. 1 and 2. This

tion, is 30½ inches and spread of feet 11½ inches. The holder and drum are of Russia iron, with nickeled lamp and trimmings. For cooking the drum is removed and the cast iron extension top with three holes can be quickly placed in position. For roasting and baking Nos. 2 and 3 ovens are furnished. The point is made that all the weight of the cylinders and utensils rests solidly on the font and not on the burner. Each lamp is supplied with an extra flame spreader for illuminating purposes when not used as a heater.

The *Canadian Trade Review* reports that the subscriptions for the 3 per cent. loan of the Government of the Dominion of Canada have aggregated over \$56,000,000, although the loan only called for \$11,250,000. The minimum price was fixed at 95, but the bulk of the loan was subscribed for at an average of 97½.

**CONTENTS.**

	PAGE
A Fifteenth Century Gun. Illustrated..	789
Storage Battery Locomotive.....	789
Steel in High Buildings .....	790
Coal Storage at the Head of Lake Superior..	790
Hydraulic Boiler Plate Bending Machine. Illustrated.....	791
Mesaba Royalties .....	792
Chief Melville's Opinion of the "Columbia" and "Minneapolis".....	792
Indiana Industries.—I.....	792
Tin Plate Makers' Wages.....	794
The Howell Torpedoes. ....	794
The Trimo Nipple Holder. Illustrated..	795
A New Labor Organization .....	795
Sale of the Chapin Mine.....	795
Conversion of a Steamer Into a Sailing Vessel.....	795
The Cornwall Ore Hills.—I.....	796
A New Bridge at Pittsburgh.....	797
Norton Brothers' New Factory.....	798
A Novel Hot Blast Heating Plant. Illus.	798
The Practical Working of the "Chicago's" Machinery and Boilers. Illus.	799
Electricity in Wire Mills.....	802
The Week.....	802
The France Grease Cup. Illustrated.....	802
Editorials:	
Railroads Favor Foreign Tin Plate.....	803
Convict Labor on Roads. ....	803
Tests of Automatic Fire Sprinkler Head.....	804
The Destruction of Capital by Technical Progress.....	804
The Moral Effect of a Technical Education. ....	804
Chicago Prices for Tank Steel.....	805
Obituary.....	805
Correspondence .....	805
Personal .....	806
San Francisco News.....	806
An Increase in Pig Production.....	807
Manufacturing:	
Iron and Steel.....	808
Machinery.....	808
Hardware.....	808
Miscellaneous .....	809
The Iron and Metal Trades:	
Chicago .....	810
Pittsburgh .....	811
Philadelphia.....	811
St. Louis.....	812
Cincinnati .....	812
Metal Market .....	812
British Metal Market.....	813
Louisville.....	813
Financial.....	813
Hardware:	
Condition of Trade .....	814
Notes on Prices.....	814
The Ohio Hardware Association .....	816
Bicycle Notes.....	817
Harrison & Wolfe. ....	818
Hardware Merchants' and Manufacturers' Association of Philadelphia... ..	818
Important Cutlery Sale.....	818
Tool Chests.....	818
Requests for Catalogues, Price-Lists, &c.....	818
Trade Items .....	818
Circulars, &c.....	818
Hon. Samuel Winslow. Portrait... ..	819
Shop System of Keeping Track of Jobs. Illustrated....	820
Selling and Repairing Bicycles.....	822
It Is Reported.....	825
Paints and Colors.....	827
A Warning to Exporters to Mexico....	828
Family Cleaver. Illustrated....	828
The Lufkin Display Rule Card. Illus.	828
Even Balance Market Scale. Illus....	828
Motor Cycles. Illustrated .....	829
A New Wrought Padlock. Illus.....	830
The Winchester Rifle, Model 1894. Illus.	830
Riveting and Farriers' Hammers. Illus.	831
Barrett's Bevel Square. Illustrated....	831
McGill's Clasps and Carding Loops. Ill.	831
Combination Heater and Cook Stove. Illustrated.....	832
Current Hardware Prices .....	833
Current Metal Prices.....	840

# Current Hardware Prices.

NOVEMBER 7, 1894.

NOTE.—The quotations given below represent Current Hardware Prices, whether made by manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail Hardware merchants. Very small orders and broken packages often command higher prices.

The character @ is used to indicate a range of price: thus discount 50 & 10% @ 50 & 10 & 5%, signifies that the goods in question are sold at prices ranging from 50 & 10% to 50 & 10 & 5%.

## Adjusters, Blind—

Domestic.....\$ dos \$3.00, 38% @ 33% & 10%  
Excelsior.....\$ dos \$10.00.....50% @ 10%  
North's.....\$ dos \$10.00.....50% @ 10%  
Zimmerman's—See Fasteners Blind.

## Ammunition—See Caps, Cartridges, Shells, &c.

## Anvils—

### American—

Eagle Anvils, \$ 24.....15 @ 15 & 5%  
Horse shoe brand, Wrought.....9% @ 10%  
Barnes Mfg. Co.....50%

### Imported—

Armstrong Mouse Hole.....3% @ 9%  
S. & H. machine finished.....9% @ 10%  
Trenton.....9% @ 10%  
Peter Wright's.....9% @ 10%

## Anvil Vise and Drill—

Allen Anvil and Vise \$3.00.....40 @ 10%  
Cheney Anvil and Vise.....25%  
Mills Falls Co., \$18.00.....20%  
Bolt's.....40 @ 40 & 10%

## Apple Parers—See Parers Apple, &c.

## Augers and Bits—

Boring Machine Augers.....70 @ 70 & 10%  
Car Bits, 12-in. twist.....50%  
Common Augers and Bits.....70 @ 70 & 10%  
Cincinnati Bell-Hangers' Bits.....40%  
Forstner Pat. Auger Bits.....25%  
Jennings' Pattern Car Bits.....40%  
Jennings' Pattern Auger Bits.....60%  
J. E. Jennings & Co., No. 10, extension  
Ip.....40%  
O. E. Jennings & Co., No. 30.....60%  
O. E. Jennings & Co., Auger Bits, \$ set  
82% quarters, No. 5, \$ 1.00, \$ 1.50, \$ 2.50  
Russell Jennings' Augers and Bits.....25 @ 10%  
Lewis' Patent Single Twist.....45%  
L'Hommedieu Car Bits.....15 @ 10%  
Pugh's Black.....20%  
Pugh's Jennings Pattern.....30%  
Snell's Bits.....60 @ 60 & 10%

## Bit Stock Drills—

Cleveland.....50 @ 10 & 5%  
Cincinnati, for wood.....40 @ 10 & 10%  
Cincinnati, for metal.....50 @ 10 & 10%  
Morse Twist Drills.....50 @ 10 & 5%  
New Process Twist Drill Co.....50 @ 10 & 5%  
Standard.....50 @ 10 & 5%  
Syracuse, for metal.....50 @ 10 & 5%  
Syracuse, for wood (wood list) 80 @ 10 & 5%

## Expansive Bits—

Clark's small, \$18; large, \$26.....40 @ 40 & 5%  
Ives' No. 4, \$ dos \$80.....40 @ 40 & 10%  
Steer's, No. 1, \$26; No. 2, \$18.....40 @ 40 & 5%  
Steer's No. 2, \$48.....20%  
Swan's.....40 @ 40 & 10%

## Gimlet Bits—

Bee.....25 @ 25 & 10%  
Common.....\$ gross \$2.50 @ 40 @ 10%  
Diamond.....\$ dos \$1.25.....40 @ 10%  
Double Cut.....40 @ 10%  
Hartwell's.....\$ gro., \$10.00.....40 @ 10%  
Douglass's.....40 @ 10%  
Ives.....60 @ 10%  
Shepardson's.....45 @ 10%  
45 @ 10% & 5%

## Hollow Augers—

Bonney's Adjustable, \$ dos.....\$21.00  
Cincinnati Adjustable.....25 @ 10%  
Cincinnati Standard.....25 @ 10%  
Douglass's.....38% @ 38% & 10%  
French, Swift & Co. (Beecher).....38% @ 38% & 10%  
Ives's.....38% @ 38% & 10%  
Ives' Expansive, each \$4.50.....50 @ 5%  
Stearns.....30 @ 10%  
Universal Expansive, each \$4.50.....20%  
Wood's, \$ dos, \$48.....25 @ 10%

## Ship Augers and Bits—

L'Hommedieu's.....15 @ 10%  
Snell's.....25 @ 25 & 10%  
Snell's Ship Auger Pat'n Car Bits.....15 @ 10%  
Watrous's.....25 @ 25 & 10%

## Awl Hafts—See Hafts, Awl.

## Awls—

Brad, Handled.....\$ gr. \$2.50 @ \$3.00  
Brad, Shouldered.....\$ gr. \$1.80 @ \$1.40  
Peg, Pat.....\$ gr. \$1.50 @ \$1.15  
Peg, Should.....\$ gr. \$1.50 @ \$1.15  
Scratch, Handled.....\$ gr. \$1.50 @ \$1.15  
Scratch, Socket.....\$ dos \$1.10 @ \$1.20

## Awl and Tool Sets—See Sets, Awl and Tool.

## Axes—

First quality, best brands.....\$6.00 @ \$6.50  
First quality, other brands.....5.50 @ 6.00  
Beveled add 50% @ doz.

## Axle Grease—See Grease, Axle.

## Axles—

No. 1 Common.....3%  
No. 2 Common.....3%  
Nos. 7 to 14.....70%  
Nos. 15 to 18.....70%  
Nos. 19 to 22.....70%  
Concord, loose collar.....4%  
Concord, solid collar.....4%

## Bag Holders—See Holders, Bag.

## Balances—

### Sash—

Caldwell, low list.....80%  
Pullman.....80%  
Sensible.....60%

### Spring—

Spring Balances.....40 @ 10%  
No. 2000 20 30  
Chatillon, \$ dos.....\$0.80 0.95 1.75 net  
Chatillon Straight Balances.....40 @ 10%  
Chatillon Circular Balances.....50 @ 10%

## Barb Wire—See Wire, Barb.

## Bars—

### Crow—

Cast Steel.....\$ 24 @ 24%  
Iron, Steel Points.....\$ 24 @ 24%

## Basins, Wash—

Standard Fiberglass, No. 1, 10% in., \$1.80;  
12-inch, \$2.00; 18% inch, \$2.50.

## Beams Scale—

Scale Beams, List Jan. 12, '83.....50 @ 10%  
Chatillon's No. 1.....40%  
Chatillon's No. 2.....50 @ 10%  
Custers'.....38%

## Beaters—

### Egg—

Bryant's.....\$ gross \$14.00  
Double (H. & R. Mfg. Co.) \$ gro., No. 0  
\$12.00; No. 1, \$15.00; No. 2, \$38.00  
Dover.....\$ dos \$1.00; \$ gro., \$10.50  
Dover, Ex. Family Size.....\$ dos, \$3.50  
Dover (Standard Co.).....\$ dos \$1.00  
Duplex (Standard Co.).....\$ dos \$1.00  
Duplex Extra Heavy (Standard Co.).....\$ dos \$1.00  
Easy (H. & R. Mfg. Co.).....\$ gro \$12.00  
Improved Acme (H. & R. Mfg. Co.).....\$ gro \$9.00  
Silver & Co.....\$ dos \$4.50  
Spiral.....\$ gro \$4.25 @ \$4.50  
Triple (H. & R. Mfg. Co.).....\$ gro \$16.50

### Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;  
No. 2, \$2.....20%

## Bells—

### Cow—

Common Wrought.....60 @ 10%  
Kentucky Durham.....70 @ 10%  
Kentucky, Sargent's list.....70 @ 10%  
Kentucky "Star".....20 @ 10%  
Texas Star.....50 @ 10%  
Western, Sargent's list.....70 @ 10%

### Door—

Crank, Brooks's.....50 @ 10%  
Crank, Cone's.....10%  
Crank, Connel's.....20 @ 10%  
Gong, Abbe's.....38% @ 10%  
Gong, Barton's.....40 @ 10%  
Gong, Yankee.....45 @ 10%  
Lever, H. & R. Mfg. Co.'s.....50 @ 10%  
Lever, Sargent's.....60 @ 10%  
Lever, Taylor's Bronzed or Plated, net  
Lever, Taylor's Japanned.....25 @ 10%  
Pull, Brook's.....50 @ 10%

### Electric—

Bigelow & Dowse.....20 @ 20 & 10%  
Wollensak's.....20 @ 20 & 10%

### Hand—

Extra Heavy Brass.....70%  
Light Brass.....70 @ 10%  
Silver Chime.....38% @ 10%  
White.....70%  
Globe Cone's Patent.....25 @ 10%

### Miscellaneous—

Call.....45 @ 50%  
Farm Bells.....\$ 24 @ 24%  
Steel Alloy Church and School Bells.....50%

## Bellows—

Blacksmith's.....60 @ 10%  
Hand Bellows.....50 @ 50 & 10%  
Molders'.....50 @ 50 & 10%

## Belt, Rubber—

Common Standard.....75 @ 10%  
Extra.....60 @ 10%  
Standard.....70 @ 10%  
N. Y. B. & P. Co., Carbon.....60 @ 10%  
N. Y. B. & P. Co., Double Diamond.....80%  
N. Y. B. & P. Co., 1846 Para.....40 @ 10%

## Bench Stops—See Stops, Bench

## Benders and Upsetters, Tire—

Brettell Tire Upsetter, \$15.....45%  
Detroit Perfection Tire Bender 15 @ 10%  
Green River Tire Benders and Upsetters.....20%  
Stoddard's Lightning Tire Upsetters.....15%

## Bits—

Auger, Gimlet, Bit Stock Drills, &c.,  
see Augers and Bits.

## Bit Holders—See Holders.

## Blind Adjusters—See Adjusters, Blind.

## Blind Fasteners—See Fasteners, Blind.

## Blind Staples—See Staples, Blind.

## Blocks—

Cleveland Block Co., Mal. Iron.....50 @ 10%  
Moore's Novelty, Mal. Iron.....80%  
Super-Grain Steel Machine Blocks 25 @ 25 & 10%  
See also Machines, Hoisting.

## Bolts—

### Carriage, Machine, &c.—

Com. list June 10, '84.....30 @ 20 @ 80 & 25%  
Genuine Eagle, Norway, list Oct. '84.....80 @ 50 @ 80 & 10%  
Eagle, Norway, list Oct. '84.....80 @ 50 @ 80 & 10%  
Phila. pattern, list Oct. 7, '84.....80%  
R. B. & W., old list.....70%  
Bolt Ends, list Jan. 1, 1890.....80 @ 20 @ 80 & 25%  
Machine, list Jan. 1, 1890.....80 @ 25%

### Door and Shutter—

Cast Iron Barrel Square, &c.....75 @ 10%  
Cast Iron Chain (Sargent's list).....65 @ 10%  
Cast Iron Shutter Bolts.....75 @ 10%  
Ives' Patent Door.....60 @ 10%  
Wrought Barrel.....75 @ 10%  
W. B. K. Flush Common.....60 @ 10%  
W. B. K. Flush Brass Knob.....60 @ 10%  
W. B. K. Shutter, Sargent's list.....60 @ 10%  
W. B. K. Shutter, all Iron, Stanley.....60 @ 10%  
Wrought Square.....75 @ 10%  
W. B. Sunk Flush, Sargent's list.....60 @ 10%  
W. B. Sunk Flush, Stanley's list.....60 @ 10%

### Stove and Plow—

Plow.....60 @ 10%  
Stove.....70 @ 70 & 5%  
R. B. & W., Plow.....55%

## Tire—

Common, list Feb. 28, '83.....70 @ 10%  
American Screw Company.....75 @ 10%  
Norway, Phila., list Oct. 16, '84.....75 @ 10%  
Eagle, Phila., list Oct. 16, '84.....80 @ 10%  
Bay State, list Feb. 28, '83.....70 @ 10%  
Franklin Moore Co.....75 @ 10%  
Norway, Phila., list Oct. 16, '84.....75 @ 10%  
Eagle, Phila., list Oct. 16, '84.....80 @ 10%  
Eclipse, list Feb. 28, '83.....70 @ 10%  
Port Chester Bolt and Nut Company.....70 @ 10%  
Empire list Feb. 28, '83.....70 @ 10%  
Keystone, Philadel., list Oct. '84.....80 @ 10%  
Norway, Phila., list Oct. '84.....75 @ 10%  
R. B. & W., Philadel., list Oct. 16, '84.....85%

## Borers, Tap—

Common and Ring.....20 @ 10%  
Clark's.....38% @ 38%  
Enterprise Mfg. Co.....25%  
Ives' Tap Borers.....38% @ 38%

## Boring Machines—See Machines, Boring.

## Bow Pins—See Pins, Bow.

## Boxes, Letter—

Tatum's.....40

## Boxes, Wagon—

Per D.....2%

## Boxes, Miter.

Spilker's Excelsior, 3 in. \$7.50, 4 in.  
\$3.50, 5 in. \$13.00, 6 in. \$15.00.....20%

## Braces—

NOTE.—Most Braces are sold at net prices.

Barber's.....50 @ 10%  
Armstrong's.....60 @ 10%  
Common Ball, American.....\$1.00 @ \$1.10  
Davis Patent.....60 @ 10%  
Fray's Genuine Spotted.....50 @ 10%  
Fray's Nos. 70 to 120, 81 to 123, 207 to 414  
Ives' New Haven Novelty.....70 @ 70 & 5%  
New Haven Ratchet.....60 @ 50 & 10%  
Barber Ratchet.....60 @ 50 & 10%  
Davis Patent.....60 @ 50 & 10%  
Spotted.....60 @ 50 & 10%  
P. S. & W. Co., Peck's Patent.....60%  
Rose & Johnson.....50%

## Brackets—

Shelf, fancy.....70 @ 70 & 10%  
Sargent's list.....70 @ 70 & 10%  
Other makes at a wide range of prices.  
Shelf, plain.....65 @ 70%  
Regular, list.....60 @ 10%  
Sargent's list.....60 @ 10%  
Bradley Shelf Brackets.....75%

## Bright Wire Goods—See Wire.

## Brollers—

Hens' Self-Inch.....9 10 9x11  
Basting.....\$ per doz. \$4.50 5.50 6.50  
Morgan Adorless.....\$ dos. \$12, 50%  
New Haven.....50%  
Wire Goods Co.....55 @ 10%

## Buckets, Well and Fire—

See Pails.

## Bull Rings—See Rings, Bull.

## Butcher's Cleavers—See Cleavers, Butcher's.

## Butts—

### Brass—

Cast Brass, Fast.....38% @ 10%  
Cast Brass, Loose Joint.....38% @ 10%  
Cast Brass, Tiebout.....50%  
Wrought Brass.....80 @ 10%  
Cast Iron—

Fast Joint, Broad.....60 @ 10%  
Fast Joint Narrow.....60 @ 10%

## Loose Joint, Japanned.....75 @ 10%

Loose Joint, Jap. with Acorns.....50%

Loose Pin, Acorns.....50%

Loose Pin, Acorns, Japanned.....50%

Loose Pin, Acorns, Japanned.....50%

Plated Tips.....50%

Mayer's Hinges.....50%

Parliament Butts.....50%

Wrought Steel—

Fast Joint, Broad.....50%

Fast Joint, Narrow.....50%

Fast Joint, Lt. Narrow.....50%

Inside Blind, Light.....50%

Inside Blind, Regular.....50%

Loose Joint, Broad.....50%

Loose Pin.....50%

Table Butts, Back Flaps, &c.....50%

Bronzed Wrought Butts.....50%

Cages, Bird—

Hendryx Brass:

3000, 5000, 1100 series.....10%

1200 series.....40%

200, 300, 600 and 900 series.....40 @ 10%

Hendryx Bronze:

700, 800 series.....40 @ 10%

Hendryx Enamelled.....40 @ 10%

Callipers—See Compasses.

## Calks Toe—

Burke's, One Prong, Blunt.....40 @ 10%

Burke's, One Prong, Sharp.....50 @ 10%

Burke's, Two Prong, Blunt.....50 @ 10%

Burke's, Two Prong, Sharp.....50 @ 10%

Gautier, One Prong, Blunt.....50 @ 10%

## Can Openers—See Openers, Can.

## Cans Milk—

S. B. & Co.: 5-gal. \$3.00; 8-gal. \$4.40;  
10-gal. \$4.75 each.....40 @ 10%

## Cans Oil—

Galvanized Blue Band, 1 gal. \$ dos. \$2.50

Galvanized Blue Band, 5 gal. Tip-Top.....\$ dos. \$11.00

Galvanized Blue Band, 5 gal. Faucet.....\$ dos. \$2.00

Glass Oil, Friend.....\$ dos. \$2.75

## Caps—Percussion—

Eley's E. B.....52 @ 50%

Hicks & Goldmark's and Union Metallic  
Cartridge Co.....45 @ 50%

E. B. Grnd. Edge, Cent. Fire, 1-10's.....47 @ 50%

E. B. Trimmer Edge, 1-10's.....47 @ 50%

F. L. Waterproof, 1-10's.....35 @ 37%

G. D.....27 @ 30%

Musket, Waterproof, 1-10's.....50 @ 53%

S. B. Genuine Imported.....45%

## Card Primers—

Berdan Primers.....2%

B. L. Caps (Sturtevant Shells) \$1.00.....2%

All other Primers, \$1.20.....2%

## Cards—

Watson's Cotton, Wool, Horse and  
File, list January 28, 1891.....

## Carpet Stretchers—

See Stretchers, Carpet.

## Cartridges—

B. B. Caps, Coll. Ball, Swgd., \$1.85 @ \$1.90

B. B. Caps, Round Ball.....\$1.80 @ \$1.90



**Chalk Lines—See Lines.****Checks, Door—**

Bardsley's ..... 20%

Unity ..... 50%

**Chisels—****Socket Framing and Firmer**

Ohio Tool Co. .... 75¢100¢30%

P. S. &amp; W. .... 30%

Wetherby ..... 30%

Buck Bros. .... 30%

Charles Buck. .... 30%

Douglass. .... 75¢75¢10%

Merrill. .... 60¢100¢80¢10%

L. &amp; J. White. .... 80¢30¢5%

**Tanged and Miscellaneous**

Charles Buck. .... 30%

Butchers. .... \$4.75¢5.00 to 2

Spear &amp; Jacksons. .... \$5 to 2

Tanged Firmer. .... 50¢50¢10%

L. &amp; J. White, Tanged. .... 25¢5%

Cold Chisels, fair quality, # 14 to 16

**Chucks—**

Beach Pat. .... each, \$8.00. .... 20%

Danbury. .... each, \$6.00, 80¢30¢25%

Graham Patent. .... 38¢4%

Morse's Adjustable, each, \$7.00, 20¢20¢25%

Syracuse, Bais Pat. .... 25%

Skinner Patent Chucks. .... 25%

Combination Lathe Chucks. .... 40%

Drill Chucks. .... 40%

Independent Lathe Chucks. .... 40%

Planer Chucks. .... 20%

Universal Lathe Chucks. .... 40%

Union Mfg. Co. .... 40%

Combination. .... 40%

Independent. .... 40%

Universal. .... 40%

Victor. .... \$3.50, 25%

**Churns—**

McDermald Star Barrel Churn, each

6 gal., \$2.60; 10 gal., \$2.75; 15 gal.,

\$3.00; 20 gal., \$3.25.

Tiffin Union, each, 5 gal., \$3.25; 7 gal.,

\$3.75; 10 gal., \$4.25.

**Clamps—**

Adjustable, Cincinnati. .... 25¢10%

Adjustable, Hammers. .... 15¢15¢5%

Adjustable, Stearns'. .... 80¢80¢10%

Barnes' Malleable Screw and Cabinet. .... 50%

Barnes' Machinist's Clamps. .... 38¢4%

Cabinet, Sargent's. .... 70¢10%

Carpenter, Cincinnati. .... 25¢10%

Carriage Makers', P. S. &amp; W. Co. .... 40¢10%

Carriage Makers', Sargent's. .... 75¢75¢5%

Eberhard Mfg. Co. .... 40¢50¢10%

Triumph's Clamps, Tatum's. .... 25¢10%

R. I. Tool Co.'s Wrought Iron. .... 25%

Saw Clamps, see Vises, Saw Filers

Stearns' Malleable, with Wrought Iron

Screw. .... 75¢75¢5%

Stearns' Steel. .... 25%

Warner's. .... 40¢100¢40¢10%

**Cleavers, Butchers—**

Beatty's. .... 40¢50¢40¢10%

Bradley's. .... 25¢50%

Foster Bros. .... 25¢50%

New Haven Edge Tool Co.'s. .... 40%

Nichols Bros. .... 30%

P. S. &amp; W. .... 38¢45¢38¢10%

Schulte, Lohoff &amp; Co. .... 40¢40¢5%

L. &amp; J. White. .... 25%

**Clips—**

Baker Axle Clips. .... 25¢10%

Norway Axle. .... 70¢70¢5%

Norway Spring Bar Clips. 60¢100¢70%

4d grade Norway Axle. .... 70¢50¢70¢10%

Steel Felloe Clips. .... # 1, 4¢4%

Superior Axle Clips. .... 70¢70¢5%

Wrought Iron Felloe Clips. # 1, 4¢4%

**Cloth and Netting, Wire**

—See Wire, &amp;c.

**Cockeyes—**

Hardware List (Globe, Kerosene, Lever

Bibbs, Racking, &amp;c.). .... 60¢20¢80¢10

**Coffee Mills—See Mills, Coff ee.****Collars, Dog—**

Brass, Pope &amp; Stevens' List. .... 40%

Chapman Mfg. Company, new list. .... 40%

Embossed, Gift, Pope &amp; Stevens' List. 80¢10%

Leather, Pope &amp; Stevens' List. .... 40%

Medford Fancy Goods Co. .... 40¢100¢50%

**Combs, Curry—**

American Curry Comb Co. .... 38¢40%

Fitch's. .... 50¢100¢50¢10%

Gibb's Magnetic. .... # doz., \$2.00

Kohler's Humane. .... # doz., \$1.75

Kohler's Magic Oscillating. .... # doz., \$2.00

Rubber, per doz., \$7.50. .... 20%

**Compasses, Dividers &c.**

Compasses, Calipers, Dividers. 70¢100¢70%

Bemis &amp; Call Co.'s

Dividers. .... 65%

Calipers, Call's Patent Inside. .... 55%

Calipers, Double. .... 65%

Calipers, Inside or Outside. .... 65%

Calipers, Wing. .... 60%

Compasses. .... 60¢25%

Excelior. .... 50%

Starrett's

Combination Dividers. .... 25%

Lock Calipers and Dividers. .... 25%

Spring Calipers and Dividers. .... 25¢10%

Stevens &amp; Co.'s. .... 25¢10%

**Coolers, Water—**

S. S. &amp; Co.: 2-gal., \$3.40; 8-gal., \$4.00;

4-gal., \$4.50; 6-gal., \$5.60 each. .... 60%

**Coopers' Tools—**

See Tools, Coopers.

**Cord**

Braided, Crown, Drab and Fancy, #

1, 55¢.

Braided, Crown White, # 1, 50¢.

Cable Laid Italian Sash. .... # 1, 10¢20¢

Common. .... # 1, 8¢40%

Common Russia Sash. .... # 1, 12¢40%

Espanian, 12 ft. long, Braided. .... 20%

Cable Laid Sash. .... # 1, 11¢10%

Massachusetts, White. .... 21¢22%

**Ossawaun Mills—**

Crown, Solid Braided White. .... # 1, 22¢

Crown, Drab and Fancy. .... # 1, 22¢

Braided Giant, Drab and Fancy. .... # 1, 30¢

Braided, Giant, White. .... # 1, 20¢

Patent, good quality. .... # 1, 10¢10%

Patent, Russia Sash. .... # 1, 13¢40%

**Samson—**

Braided, Drab Cotton. .... # 1, 42¢

Braided, Italian Hemp. .... # 1, 40¢

Braided, Linen. .... # 1, 40¢

Braided, White Cotton. .... # 1, 37¢

Semper Idem, Braided, White. .... 20%

**Silver Lake**

A quality, Drab, 55¢.

A quality, White, 50¢.

B quality, Drab, 85¢.

B quality, White, 80¢.

Sylvan Spring, Extra Braided, Drab. .... 34¢

Sylvan Spring, Extra Braided, White. .... 34¢

**Tate's Cold Braided—**

Economy Drab. .... # 1, 07¢

Economy, White. .... # 1, 22¢

Hercules, Drab. .... # 1, 30¢

Hercules, White. .... # 1, 35¢

White Cotton Braided, fair. .... # 1, 38¢24%

**wire Pictures—**

Braided or Twisted. .... 80¢100¢80¢24%

**Corkscrews—See Screws, Cork.****Corn Knives and Cutters**

—See Knives, Corn.

**Crackers, Nut—**

Acme.

Japanned, # gro., \$30. .... 50%

Nickel Plated, # gro., \$30. .... 37%

Fancy Nickel Plated, # gro., \$30. .... 40%

Table (H. &amp; B. Mfg. Co.). .... 49%

Turner &amp; Seymour Mfg. Co. .... 50%

**Cradles—**

Grain. .... 50¢20¢50¢25%

**Crays—**

White Crays, # gross. .... 60¢60%

Cases, 100 gr., \$3.75¢4.25, at factory.

D. M. Steward Mfg. Co.

Metal Workers', # gross, \$2.50, 20¢35%

Railroad, # gross, 2.00, 20¢35%

Rolling Mill, # gross, 2.50, 20¢35%

Soapstone Pencils, # gross, 1.50, 20¢35%

See also Chalk.

**Creamery Pails—See Pails,**

Creamery.

**Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

**Cutters—Meat—**

American.

Nos. 1 2 3 5 8 10 12 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Enterprise. .... 25%

Nos. .... 10 12 22 32 42

Each. .... \$3 \$2.50 \$4 \$6 \$15

Dixon's, # doz. .... 40¢40¢5%

Nos. .... 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Draw Cut, each. .... \$14.00 \$17.00 \$19.00 \$30.00

Nos. 5 2 6 8

Hale's, # doz. .... \$50 \$75 \$80 \$225. .... 20¢25%

Nos. .... 11 12 13

Home No. 1, # doz. .... \$27.00 \$33.00 \$45.00

Little Giant, # doz. .... \$28.00. .... 55¢10%

Nos. 305 310 312 320 322

Miles' Challenge, # doz. .... \$35.00 \$48.00 \$44.00 \$72.00 \$88.00

Nos. .... 1 2 3

Triumph No. 505, # doz. .... \$22.00. .... 25¢30%

Woodruff's, # doz. .... 40¢40¢5%

Nos. .... 100 150

Chadborn's Smoked Beef Cutter, # doz. .... \$15.00 \$18.00

Enterprise Beef Shavers. .... 20%

**Slaw and Kraut—**

Tucker &amp; Dorey Mfg. Co.

Kraut Cutters. .... 40%

Slaw Cutters, 1 Knife, # gross. .... \$21.00

Slaw Cutters, 2 Knife, # gross. .... 30.00

**Tobacco**

Acme. .... # doz., \$20.00, 40%

All Iron. .... # doz., \$4.00

Champion. .... # doz., \$5.00

National Co.'s, # doz. .... \$18.00 \$50¢10%

Sargent's. .... # doz., \$24.00, 60¢60¢10%

**Washer**

Appleton's. .... # doz., \$18.00. .... 60¢100¢60¢10%

Bonney's, # doz., \$8.50. .... 50¢50¢10%

Cincinnati. .... # doz., \$11.00, 25¢10%

Johnson's, # doz., \$11.00, 25¢10%

Penny's, # doz., \$11.00, 25¢10%

Smith's, # doz., \$12.00, 20¢10¢10%

Tatum's. .... 25¢10%

**Diggers, Post Hole, &c.—**

Cronk's Post Bars, # doz. .... \$30.00

Eureka Diggers. .... # doz., \$11.00

Fletcher Post Hole Augers, # doz. .... \$38.00

Gem, Improved. .... # doz., \$35.00

Gibbs' Columbia. .... # doz., \$12.00

Gibbs' Hustler. .... # doz., \$12.00

Gibbs' Imperial. .... # doz., \$12.00

Gibbs' National. .... # doz., \$12.00

Gibb's Post Hole Digger. .... # doz., \$12.75

Kohler's Hercules. .... # doz., \$12.00

Kohler's Invincible. .... # doz., \$10.00

Kohler's Little Giant. .... # doz., \$14.00

Kohler's Champion. .... # doz., \$18.00

Kohler's Pioneer. .... # doz., \$18.00

Ryan's. .... # doz., \$17.50

Samson, # doz., \$34.00. .... 25¢25¢10%

Universal. .... # doz., \$15.00

Shimer's Hollow Handle. .... # doz., \$24.00

Vaughan's Post Hole Auger, # doz. .... \$35.00¢39.50

**Dividers—See Compasses.****Dog Collars—See Collars, Dog.****Door Checks—**

See Checks, Door.

**Door Springs—**

See Springs, Door.

**Drawers, Money—**

Money Drawers, # doz. .... \$120.00

Waddell's Improved, No. 1, # doz. \$15.00

Waddell's Improved No. 2, # doz. \$18.00

Waddell's Comb, Cutlery Case and

Alarm Till. .... \$12.50

**Drawing Knives—**

See Knives, Drawing.

**Drills and Drill Stocks—**

Automatic Boring Tools. .... \$1.75¢1.85

Bench Drills, Stearns'. .... each \$7.50

Blacksmiths' ..... each \$7.50

Blacksmiths' Self-Feeding, each \$7.50, 20%

Breast, Bartholomew's, No. 12, # doz. .... \$10.00

Breast, Millers Falls. .... each \$3.00, 25%

Breast, P. S. &amp; W. .... 40¢10%

Breast, Wilson's. .... 80¢25%

Chicago Automatic Drill. .... each \$7.50

Goodell Automatic Drills. .... 40¢50¢10%

**Halters—**

Covert's Adj. Rope Halters.....	40¢2½
Covert's Adj. Web Halters.....	35¢5½
Covert's Hemp Horse and Cattle Tie.....	50¢10½
Covert's Jute Cattle Ties.....	70¢10½
Covert's Jute Horse Ties.....	70¢10½
Covert's Rope, 7/16-in., Jute.....	70¢10½
Covert's Rope, 1/2-in., Hemp.....	35¢2½
Covert's Rope, Jute.....	60¢10½
Covert's Saddlery Works Halters.....	35¢4½
Covert's Saddlery Works Handy Web Halters.....	35¢4½
Covert's Saddlery Works Horse and Cattle Ties.....	35¢4½

**Hammers—****Handled Hammers—**

Atha Tool Co.....	50¢10¢60¢
Buffalo Hammer Co.....	50¢10¢60¢
Hudson & Beckley.....	50¢10¢60¢
Verree.....	40¢10¢
Cheney's Claw.....	40¢10¢
Cheney's Machinist's & Riveting.....	60¢5¢
C. Hammond & Son.....	40¢10¢50¢
Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....	30¢10¢
Maydole's, 1894 list.....	25¢10¢40¢
Pack, Stow & Wileox.....	40¢10¢40¢
Fayette R. Plumb.....	40¢10¢40¢
Artisan's Choice, A. E. Nail.....	40¢10¢40¢
Engineers' and B. S. Hand.....	60¢10¢
Machinist's Hammers.....	60¢10¢
Plain Y. & P. A. E. Nail.....	40¢10¢40¢
Other Nail Hammers.....	40¢10¢40¢
Sargent's.....	40¢10¢40¢
Warner & Noble's new list.....	25¢10

**Heavy Hammers and Sledges—**

8 lb and under.....	80¢80¢10¢
8 to 5 lb.....	80¢80¢10¢
Over 5 lb.....	80¢80¢10¢
Wilkinson's Sledge.....	10¢10¢10¢

**Handcuffs and Leg Irons—**

See Police Goods.

**Handles—****Cross-Cut Saw Handles—**

Atkins.....	40¢
Champion.....	45¢45¢10¢
Elly's Perfection.....	50¢50¢10¢
Sensible # doz. Pr.....	50¢50¢10¢

**Iron, Wrought or Cast—**

Barn Door, # doz.....	20¢5¢
Bronze Iron Drop Latches.....	60¢60¢
Chest, Sargent's list.....	50¢10¢10¢10¢
Door or Thumb.....	0
Nos.....	1 2 3 4
Per doz.....	\$0.90 1.00 1.08 1.35 1.50

**Wood—**

Anger, assorted.....	gr 5.00
Anger, large.....	gr 7.00
File, assorted.....	gr 2.75
Brad Ayl.....	gr 2.00
Apple Firmer Chisel, ass'd.....	gr 5.00
Apple Firmer Chisel, large.....	gr 6.00
Chickory Firmer Chisel, ass'd.....	gr 5.00
Chickory Firmer Chisel, large.....	gr 6.00
Socket Firmer Chisel, ass'd.....	gr 3.00
Socket Framing Chisel, ass'd.....	gr 5.00
Chisel, Fibre Head.....	33¢
Hammer, Hatchet, Axe, &c.....	40¢40¢5¢
Hoe, Rake, Shovel, &c.....	60¢10¢
Pat. Auger, Douglass.....	set 1.25
Pat. Auger, Ives.....	30¢10¢
Pat. Auger, Swan's.....	set 1.00
Saw and Plane.....	40¢10¢50¢

**Hangers—**

Barn Door, New England.....	70¢70¢5¢
Barn Door, old patterns.....	70¢70¢5¢
Barry.....	50¢
Best Anti-Friction.....	60¢10¢60¢10¢5¢
Boss.....	60¢10¢60¢10¢5¢
Carrier Steel Anti-Friction.....	50¢10¢
Champion.....	30¢10¢
Chicago Anti-Friction.....	50¢55¢5¢
Climax Anti-Friction.....	50¢55¢5¢
Crunk's Patent, Steel Covered.....	60¢10¢
Duplex (Wood Track).....	60¢10¢5¢
Economy.....	60¢10¢
Hamilton Wrought Steel Track.....	60¢10¢
Interstate.....	60¢10¢
Kidder's.....	50¢50¢10¢
Lane's New Standard.....	50¢50¢10¢
Lane's Parlor.....	40¢40¢5¢
Lane's Standard.....	50¢50¢10¢
Lundy Steel Parlor.....	40¢
Matchless.....	60¢60¢
Moody.....	45¢
Moore's Baggage Car Door.....	33¢
Moore's Elevator.....	33¢
Moore's Railroad.....	55¢
Nickel, Steel, Nos. 0, 25; 1, 20; 2, 15.....	40¢10¢50¢
Orleans Steel.....	40¢10¢50¢
Paragon No. 1, \$3.50; No. 2, \$4.10; No. 3, \$5.50 # doz.....	\$2.00
Paragon Parlor, per set.....	40¢40¢10¢
Perfection.....	50¢10¢50¢10¢5¢
Richards.....	30¢30¢10¢
Samson Steel Anti-Friction.....	40¢10¢40¢10¢5¢
Star.....	25¢10¢10¢
Stearns' Anti-Friction.....	20¢10¢10¢
Stearns' Challenge.....	25¢10¢10¢
Sterling.....	50¢10¢60¢
Terry's Ideal.....	50¢10¢50¢10¢5¢
Terry's Modern.....	50¢10¢50¢10¢5¢
Terry's Shield.....	60¢10¢60¢
Terry's Solid.....	50¢10¢60¢
Terry's Wrought Single Strap.....	50¢10¢
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.....	50¢25¢
Warner's Fat.....	20¢10¢10¢
Wild West.....	50¢50¢5¢
Zenith for Wood Track.....	55¢

**Harness Snaps—See Snaps.****Hatchets—**

American Axe and Tool Co.....	40 & 10
Blood's.....	50
Hunt's.....	50
Kurt's.....	50
Mann's.....	50
Underhill's.....	50
O. Hammond & Son.....	50
Fayette R. Plumb.....	10
Collins.....	10
Buffalo Hammer Co.....	10
Kelly's.....	50 & 50
P. & W. Co.....	10
Sargent & Co.....	10
Schulte, Lohoff & Co.....	10
Ten Eyck Edge Tool Co.....	10

**Hay and Straw Knives**

See Knives.

**Hinges—****Blind Hinges—**

Clark's.....	75¢10¢5¢
Nos. 1, 3, 5, 1893, Old Pattern.....	75¢10¢5¢
Nos. 1 and 3, Tip Pattern.....	75¢10¢5¢
No. 50 Buffalo Noiseless.....	40, 60
and 65.....	75¢
Buffalo Reversible, Nos. 3, 2, 75¢	1 and 0.....
1 and 0.....	80¢10¢
No. 1 Cottage, for wood only.....	80¢10¢
Dixie L. & P., Nos. 3, 2½, 2, 1½, 1, 0, 00, 4 and 5.....	75¢5¢
No. 25 Empire Reversible.....	75¢10¢
Lull & Porter, Nos. 3, 2½, 2, 1½, 1, 0, 00, 4 and 5.....	75¢10¢
4 and 10.....	60¢
Huffer.....	50¢50¢10¢
Parker.....	75¢10¢
North's Automatic Blind Fixtures.....	10
2, for Wood, \$9.00; No. 3, for Brick.....	10
Reading's Gravity.....	75¢10¢75¢10¢5¢
Sargent's Nos. 1, 3, 5, 11, 12, 13.....	75¢10¢75¢10¢5¢

**Shepard's:**

Acme, Lull & Porter, Nos. 3, 2½, 2, 1½, 1, 0, 00, 4 and 5.....	75¢5¢
Buffalo Gravity Locking, Nos. 1, 3 and 5.....	80¢10¢
Champion Gravity Locking, No. 75.....	80¢10¢

**Clark's or Shepard's 1893, Old Pattern, Nos. 1, 3 and 5.....**

Clark's or Shepard's Tip Pattern.....	75¢10¢5¢
Nos. 1, 3 and 5.....	75¢10¢5¢
Double Locking, Nos. 20 and 25.....	70¢5¢
Empire, Nos. 101 and 103.....	75¢5¢
Niagara Gravity Locking, Nos. 1, 3 and 5.....	80¢10¢
No. 50, 60, 65 and 68.....	75¢
N. S. Lull & Porter, Nos. 3, 2½, 2, 1½, 1, 0, 00, 4 and 5.....	75¢10¢5¢
Pioneer, Nos. 000, 45 and 55.....	75¢
Steamboat Gravity Locking No. 10.....	80¢10¢

**Gate Hinges—**

Automatic.....	# doz \$12.50, 50¢
Clark's, Nos. 1, 2, 3.....	60¢10¢60¢10¢5¢
N. E. Y. State.....	# doz \$7.50, 60¢80¢10¢
N. E. Reversible.....	# doz \$5.00, 60¢80¢10¢
N. Y. State.....	# doz \$4.00, 60¢80¢10¢
Shepard's Nos. 1, 2, 3.....	60¢10¢60¢10¢5¢
Western.....	# doz \$4.20, 60¢80¢10¢

**Spring Hinges—**

American.....	20¢
Bardsley's Patent Checking.....	15¢
Barker's Double Acting.....	35¢
Bommer's Japanese.....	30¢
Bommer's All other kinds.....	30¢
Buckman's.....	15¢20¢
Champion.....	60¢
Chicago.....	30¢
Columbia.....	# gross, \$10.00
Crown.....	# gross, \$12.00
Devereux.....	# gross, \$12.00
Freeport.....	# gross, \$12.00
Geer's Spring and Blank Butts.....	40¢
Gem.....	20¢
Ideal No. 3.....	# gross \$8.00
J. G. C. Covered, # gross.....	\$9.00
Knox.....	# gross, \$12.00
New Idea No. 1.....	# gross, \$10.00
New Idea No. 2.....	# gross, \$13.00
New Idea Dbl. Acting.....	45¢
No. 10 Matchless.....	60¢
No. 25 Unbreakable.....	60¢
Oxford.....	20¢
Reliable.....	15¢
Rex.....	# gross, \$10.00
Royal.....	60¢
Samson.....	60¢60¢75¢
Stearns' Noiseless Floor Hinge.....	# set, \$5.00.....
Surprise.....	# gross, \$12.00
Union Mfg. Co.....	25¢
Union Spring Hinge Co.'s list.....	25¢
March, 1893.....	20¢
Wiles, No. 1, # gross, \$18; No. 2.....	\$18

**Wrought Iron Hinges—**

Strap and T. List May.....	60¢10¢10¢
22, 1894.....	60¢10¢10¢5¢
Corrug'd Strap and T.....	50¢
Plate Hinges, 8, 10 & 12 in., # doz.....	50¢
Providence, over 12 in.....	60¢
Rolled Blind Hinges, Nos. 32 and 34.....	50¢10¢

**Rolled Blind Hinges, Nos. 22 and 24.....**

Rolled Plate.....	70¢10¢
Rolled Raised.....	70¢10¢
Screw Hook and Eye.....	1/4 in. # 45¢
1/2 in. # 45¢	1/2 in. # 45¢
3/4 in. # 45¢	3/4 in. # 45¢
1 in. # 45¢	1 in. # 45¢

**Screw Hook and Eye.....**

Screw Hook and Eye.....	1/4 to 1 1/2 in., # 35¢
Strap.....	1 1/2 to 2 in., # 35¢
2 1/2 to 3 in., # 35¢	2 1/2 to 3 in., # 35¢

**Hoes and Oval Pattern.....**

Scovill.....	50¢10¢60¢
D. H. Scovill.....	20¢90¢
Grub.....	60¢10¢
Lane's Crescent, Planters' Pattern.....	45¢5¢
Lane's Razor Blade, Scovill Pat.....	80¢5¢

**Handled—**

Garden, Mortar, &c.....	70¢70¢5¢
Magie.....	# doz \$4.00
Planter's, Cotton, &c.....	70¢70¢5¢
Warren Hoe.....	60¢60¢5¢

**Hog Rings and Rings—**

See Rings and Rings.....	
--------------------------	--

**Holisting Apparatus—**

See Machines, Holisting.....	
------------------------------	--

**Hollow-Ware—**

See Ware, Hollow.....	
-----------------------	--

**Holders—**

Sensible Bag and Twine.....	50¢
Sprenkle's Pat.....	# doz \$18.....

**Bit—**

Angular.....	# doz \$24.00, 40¢5¢
Barber's.....	# doz \$15.00.....
Ives.....	# doz \$20.00.....

**File and Tool—**

Bals Pat.....	# doz \$4.00, 25¢
Nicholson File Holders.....	80¢

**Sash—**

Motley's Adj. Sash, Medium Size.....	# doz \$1.30, 40¢
--------------------------------------	-------------------

**Hooks—Cast Iron—**

Bird Cage, Reading.....	60¢10¢10¢70¢
Bird Cage, Sargent's List.....	60¢10¢10¢70¢
Clothes Line, Sargent's List.....	50¢50¢10¢
Celling, Sargent's List.....	50¢50¢10¢

**Clothes Line, Moore's.....**

Clothes Line, Reading.....	60¢10¢60¢10¢10¢
----------------------------	-----------------

**Coat and Hat, Moore's.....**

Coat and Hat, Reading.....	50¢10¢50¢10¢10¢
----------------------------	-----------------

**Coat and Hat, Sargent's List.....**

Hammock, E. C. Stearns & Co., # doz.....	60¢
--	-----

**Harness, Reading List.....**

Wire.....	55¢10¢55¢10¢10¢
-----------	-----------------

**Atlas, Coat and Hat.....**

Belt.....	80¢15¢80¢20¢
Handy Hat and Coat.....	50¢10¢60¢
Indestructible Coat and Hat.....	45¢45¢5¢
Steady Ceiling Hooks.....	50¢10¢60¢
Williamson's Bird Cage Hooks, List.....	40¢
April, 1892.....	40¢
Wire Coat and Hat, Gem, list April.....	60¢80¢10
Wire Coat and Hat, Miles, list April.....	60¢80¢10
Wire Coat and Hat, Standard.....	60¢80¢10
Bright Wire Good-See Wire.....	60¢80¢10

**Wrought Iron—**

Cotton.....	# doz \$1.25
Cotton Pat. (N. Y. Mallet and Handle.....	30¢
Wks.....	30¢
Tassel and Picture, T. & S. Mfg. Co.....	50¢
Wrought Staples Hooks, &c.....	50¢

**Miscellaneous—**

Bush.....	55¢60¢
Fish Hooks, American.....	50¢
Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25.....	60¢10¢10¢
Hooks and Eyes—Brass.....	80¢10¢10¢
Hooks and Eyes—Malleable Iron.....	70¢70¢10¢
Noll's Grass.....	# doz \$2.25
Whiffletree—Patent.....	55¢
Bench Hooks—See Bench Stops.....	

**Horse Nails—See Nails, Horse****Horse Shoes—**

See Shoes, Horse.....	
-----------------------	--

**Hose, Rubber—**

Competition, Fair quality.....	75¢75¢10¢
Competition, Low Grade, 1/4 in. # ft. 5 1/2.....	60¢10¢60¢10¢10¢
Extra.....	60¢10¢60¢10¢10¢
N. Y. B. & P. Co., Carbon.....	70¢
N. Y. B. & P. Co., Double Diamond.....	50¢10¢5¢
N. Y. B. & P. Co., 1846 Para.....	40¢5¢
Cotton Garden, 1/4 in., coupled.....	74¢
Fair Quality, # ft.....	84¢
Good Quality, # ft.....	84¢

**Huskers—**

Blair's Gloves.....	# doz, pair:
No. 138, \$8; No. 142, \$7; No. 145, \$7.....	
No. 146, \$9; No. 150, \$9; No. 152, \$7.60.....	
No. 170, \$2.....	6¢
Blair's Mins, # gross.....	\$10.50
No. 150, \$7; No. 165, \$10.50.....	
Boss, Styles A and B, \$2.40; E, \$2.10.....	
doz., net.....	
Hubbard's Solid Steel.....	# gr 4.50

**Indurated Fiber Ware—**

See Ware, Indurated Fiber.....	
--------------------------------	--

**Irons. Curling—**

Nicol's Patent Curling Iron Heater.....	\$1.00
Shirley Grace Darling Curling.....	Iron, # doz.....
No. 65.....	\$1.75
No. 66.....	1.50
No. 67, Mustache.....	1.25

**Sad—**

From 1 to 10, at factory.....	# 100 lb.....
B. B. Sad Irons, # doz (at factory).....	\$2.25
Chinese Laundry (N.E. Butt Co.) # doz.....	\$5.40
Chinese Sad.....	30¢34¢
Crown Improved.....	60¢10¢10¢
Ideal Irons, No. 250, # set, 60¢; No. 255.....	55¢
Mahony's Troy Roll Irons.....	2



**Plate**—  
Bomer's Night Latches.....15¢  
B. & E. Mfg. Co., list Mar. 30, 1888.....  
60¢10¢70¢  
Sargent & Co., list July, 1894. 60¢10¢70¢  
Warner's Burglar Proof. \* doz. \$3.00, 60¢

**Elevator—**

Moore's.....83¢

**Padlocks—**

**Wrought Iron Padlocks:**  
Brittan, Graham & Mathes, list Jan., 1894.....75¢  
Mallory, Wheeler Co., list Jan. 1, 1894.....75¢  
Norwich Lock Mfg. Co., list June 10, 1891.....60¢2¢  
Russell & Erwin Mfg. Co., list June 10, 1891.....60¢2¢  
Sargent & Co., list January 1, 1894.....75¢  
William Wilcox Mfg. Co., list January 1, 1894.....75¢2¢  
Ames Sword Co. up to No. 103 incl. 60¢  
Ames Sword Co. above No. 103.....60¢10¢  
Barnes Mfg. Co.....40¢10¢10¢  
Champion Padlocks.....40¢  
Eagle.....40¢  
Eureka, Eagle Lock Co.....40¢2¢  
Z. T. Fraim's Keystone Scandinavian, 1010 line.....90¢50¢  
120 line.....90¢25¢  
109 line.....70¢10¢  
510 line.....70¢  
225, 610 and 300 line.....70¢  
All other numbers.....50¢5¢  
Horsehoe.....\* doz \$9.50¢50¢10¢  
Hotchkiss.....30¢  
Nock's.....30¢  
Romer's Nos. 0 to 91.....30¢  
Romer's Scandinavian, &c., Nos. 100 to 605.....15¢  
Scandinavian.....90¢50¢  
Claymaker, Barry & Co., No. 1010 line.....90¢  
No. 41 line.....60¢  
No. 61 line.....70¢  
No. 21 line.....60¢  
No. 109 line.....90¢40¢  
Star.....60¢  
Yale Lock Mfg. Co.'s.....net prices

**Sash, &c.—**

Attwell Mfg. Co.....25¢32¢  
Champion Safety list January, 1893. 70¢  
Clark's No. 1, 110; No. 2, 83 \* gr \$4.00  
Common Sense Jap'd Cop'd and Br'd.....\* gr \$4.00  
Common Sense, Nickel Plated.....\* gr \$10.00  
Corbin's Daisy, list Feb. 15, 1888.....70¢  
Davis Bronze, Barnes Mfg. Co.....35¢  
Ferguson's.....35¢  
Fish (Liesche's pat.), No. 100, \* gr \$3; No. 105, \* gr \$10.....50¢  
Giant, list Jan. 1892.....70¢10¢  
Hammond's Window Springs.....40¢  
Hugunin's New Sash Locks.....25¢5¢  
Hugunin's Sash Balances.....25¢5¢  
Ives Patent.....60¢10¢50¢10¢10¢  
Kempshall's Gravity.....60¢  
Kempshall's Model.....60¢60¢10¢  
Monarch.....50¢  
Payson's Perfect.....60¢10¢10¢  
Reading.....60¢10¢60¢10¢10¢  
Security.....30¢  
Universal.....60¢10¢2¢  
Victor.....10¢  
Walker's.....10¢  
Wolcott's.....60¢10¢5¢

**Lumber Tools—**

See Tools, Lumber.

**Lustro—**  
one-ounce bottles.....\* doz, \$1.75; \* gross.....\$17.00

**Machines.****Boring—**

Without  
Augers' Upright. Angular.  
Boss, Carpenters' 3.50  
Boss, Ship Bldrs' 3.75  
Douglas.....\$5.50 \$6.75.....50¢  
Jennings.....5.50 6.75.....50¢50¢5¢  
Millers Falls.....7.50.....25¢  
Phillips Patent  
with Auger.....7.00 7.50.....40¢10¢10¢  
Snell's, Rice's Pat. 5.50 6.75.....40¢10¢10¢

**Fluting—**

American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....35¢  
Combined Fluter and Sad Iron.....\* doz \$15.00.....30¢  
Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$6.50 each.....35¢  
Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.....30¢  
Crown Jewel, 6 in.....\$3.50 each.....35¢  
Domestic Fluter.....each \$1.50  
Eagle, 8 1/2-inch Rolls, \$2.15.....35¢  
Eagle, 6 1/2-inch Rolls, \$2.85.....35¢  
Knix, 4 1/2-inch Rolls.....\$3.25 each.....35¢  
Knix, 6-inch Rolls.....\$3.60 each.....35¢

**Holisting—**

Moore's Anti-Friction Differential Pulley Block.....20¢  
Moore's Hand Hoist, with Lock Brake.....20¢  
Moore's Rope Differential Pulley Block.....80¢  
Harris & Beeley (Teal Patent).....80¢  
See also Blocks.

**Washing—**

Fair and Square.....\* doz \$42.00  
Anthony Wayne.....\* doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.....\* doz \$36.00  
Wayne American.....\* doz \$36.00  
Wells.....\* doz \$36.00  
Western Star \* doz, No. 2, \$36 No. 3 \$39

**Mallets—**

B. & L. Block Co., Hickory & L. V.....80¢10¢40¢  
Fibre Head, Stearns.....33¢  
Hickory.....20¢10¢20¢10¢10¢  
Lignumvite.....20¢10¢20¢10¢10¢

**Mattocks—**

Regular list.....60¢10¢60¢10¢5¢

**Measures—**

Standard Fireware, No. 1, peck \* dozen, \$3.50; 1/4-peck, \$3.00

**Meat Cutters—**

See Cutters, Meat.

**Menders—**

Harness.....\* doz., \$1.75  
Hudson's Hose Menders, in set, \* doz., \$3.00

Hudson's Hose Bands.....\* gr., \$1.25

**Milk Cans—See Cans, Milk.**

**Mill—**

Box and Side, list Jan. 1, 1888. 60¢10¢10¢  
Net prices are often made which are lower than above discount.

American, Enterprise Mfg. Co., list Jan. 17, 1893.....20¢  
National list, Jan. 1, 1894.....30¢  
Swift, Lane Bros.....30¢  
Waddell's New Box Mills, Ideal Brand, New List.....60¢60¢10¢

**Mincing Knives—**

See Knives, Mincing.

**Molasses Gates—**

See Gates, Molasses.

**Money Drawers—**

See Drawers, Money.

**Mowers, Lawn—**

10 in. 12 in. 14 in.  
Best.....\$4.00 \$5.25 \$4.50 \$6.00 \$5.00 \$6.75  
Good.....\$3.00 \$3.25 \$3.50  
Cheap.....2.25 2.50 2.75

**Muzzles—**

Safety.....\* doz, \$3.00, 25¢

**Nails—**

Cut and Wire. See Trade Report.

Wire Nails, Papered Association list, May 1, '92.....85¢10¢5¢

Hungarian, Finishing, Upholsterers', &c. See Tacks.

**Horse—**

Nos. 6 7 8 9 10  
A. C.....25¢ 25¢ 25¢ 21¢ 21¢ 40¢10¢  
American.....9¢ 9¢ 9¢ 9¢ 9¢ net  
Anchor.....23¢ 21¢ 20¢ 19¢ 18¢ 35¢  
Ausable.....23¢ 20¢ 25¢ 24¢ 23¢ 40¢5¢2¢

Capewell.....19¢ 18¢ 17¢ 16¢ 15¢ 10¢5¢  
C. B. K.....23¢ 23¢ 23¢ 21¢ 21¢ 40¢

Champion.....25¢ 23¢ 23¢ 21¢ 20¢ 10¢10¢10¢  
Champlain.....23¢ 20¢ 25¢ 24¢ 23¢ 40¢5¢2¢

Clinton, Fin.....19¢ 17¢ 16¢ 15¢ 14¢ 30¢5¢  
Empire Bronzed.....11¢11¢  
Essex.....23¢ 22¢ 22¢ 21¢ 21¢ 40¢10¢50¢

Lyra.....9¢ 9¢ 9¢ 9¢ 9¢ 50¢  
Maud S.....23¢ 23¢ 23¢ 21¢ 21¢ 60¢10¢5¢

Northwest'n.....25¢ 23¢ 22¢ 21¢ 20¢ 25¢25¢5¢

Putnam.....23¢ 21¢ 20¢ 19¢ 18¢ 15¢  
Snowden.....9¢ 9¢ 9¢ 9¢ 9¢ net  
Standard.....23¢ 21¢ 20¢ 19¢ 18¢ 35¢  
Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢ 25¢  
Western.....23¢ 21¢ 20¢ 19¢ 18¢ 50¢

**Picture—**

Brass Head, Combination list.....50¢10¢  
Brass Head, Sargent's list.....60¢60¢10¢  
Porcelain Head, Combination list.....40¢10¢  
Porcelain Head, Sargent's list.....50¢10¢10¢  
Niles' Patent.....40¢

**Nail Pullers—See Pullers, Nail.****Nail Sets—See Sets, Nail.****Nippers, See Pliers and Nippers****Nut Crackers—**

See Crackers, Nut.

**Nuts—List Dec. 18, 1889.**

Square, Hex.  
Cold Punched.....5¢ 5¢ off list  
Hot Punched.....6¢ 6¢ off list  
In packages of 100, add 1-10¢ \* doz, net; in packages less than 100, add 1/2¢ \* doz, net.

**Oakum—**

Best or Government.....\* doz @ 8¢4¢  
Navy.....\* doz @ 6¢4¢  
U. S. Navy.....\* doz @ 5¢5¢

**Oil Tanks—See Tanks, Oil.****Oilers—**

Brass and Copper.....50¢10¢50¢10¢5¢  
Zinc and Tin.....70¢70¢10¢  
Broughton's Brass.....60¢  
Broughton's Zinc.....90¢  
Malleable, Hammers' Improved, No. 1, \$3.50; No. 2, \$4.00; No. 3, \$4.40.....10¢5¢  
Malleable, Hammers' Old Pattern, same list.....60¢  
Olmead's Brass and Copper.....60¢  
Olmead's Tin and Zinc.....60¢  
Prior's Pat. or "Paragon" Brass.....60¢  
Prior's Pat. or "Paragon" Zinc.....60¢  
Steel, Draper & Williams.....60¢  
Wilnot & Hobbs Mfg. Co., Steel Anti-Rust.....60¢

**Openers, Can—**

American.....\* gross \$1.75 \$2.00  
Champion.....\* doz \$2.00.....60¢  
Domestic.....\* doz \$2.00.....45¢  
Duplex.....\* doz \$2.50.....50¢  
Eureka.....\* doz \$2.50.....50¢  
Excellor, No. 1, \$2.50; No. 2, \$1.50.....40¢  
French, No. 4.....\* doz \$2.25, 55¢60¢  
Iron Handle, No. 5.....\* gr \$6.00, 45¢60¢  
Lyman's.....\* doz \$3.75, 20¢  
Messenger's Comet.....\* doz \$3.00, 25¢  
Moore's.....\* doz \$2.75, 75¢  
Sargate, No. 1, 55¢; 2, 60¢; 3, 65¢.....\* doz \$2.75  
Star.....\* doz \$2.75  
Streeter's:  
Sensible, Japanned, per doz.....60¢  
Sensible, Nickel, per doz.....75¢  
Surprise, per doz.....25¢  
New Sprague, Wood H'dle, per doz.....50¢  
Universal.....\* doz \$3.00.....55¢5¢  
World's Best \* gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50¢10¢

**Packing, Steam—****Rubber—**

Standard, fair quality.....70¢10¢75¢  
Interior quality.....75¢10¢80¢  
Extra.....60¢5¢60¢10¢5¢  
Jenkins' Standard, \* doz.....25¢25¢5¢  
N. Y. B. & P. Co., Double Diamond.....60¢  
N. Y. B. & P. Co., Salamander.....45¢  
N. Y. B. & P. Co., Carbon.....70¢5¢

**Miscellaneous—**

American Packing.....9¢10¢ \* doz  
Cotton Packing.....14¢15¢ \* doz  
Italian Packing.....15¢16¢ \* doz  
Jute.....9¢10¢ \* doz  
Krisa Packing.....15¢16¢ \* doz

**Pails—**

S. S. & Co., 13-qt., \$7.00; 20-qt., \$7.25

\* doz.....\$5

**Galvanized Pails—**

Light.....\$2.00 \$2.25.....\$2.25 \$2.50  
Heavy.....2.25 2.50.....2.50 2.75

10 Quart.....2.25 2.50.....2.50 2.75  
12 Quart.....2.50 2.75.....2.75 3.00  
14 Quart.....2.75 3.00.....3.00 3.25

**Galvanized Buckets—**

Fire.....\$2.50 \$2.75.....\$2.25 \$2.50  
Well.....2.75 3.00.....2.50 2.75

**Indurated Fiber Ware**

Fire Pails, deep.....\* doz \$4.30  
Fire Pails, round bottom.....\* doz \$5.40  
Milk, 14 qt.....\* doz \$5.40  
Stable, 14 qt.....\* doz \$6.00  
Star Pails, 12 qt.....\* doz \$4.20

**Standard Fiber Ware**

Buggy Pails.....\$3.00  
Chamber Pails, 14 qt.....\$7.00  
Dairy Pails, 14 qt.....3.75 4.25  
Fire Pails, No. 1, 12 qt.....3.75  
Fire Pails, No. 2, 14 qt.....4.25  
Horse Pails.....4.00  
Slop Jars (bal. trap).....7.50 8.50  
Sugar Pails.....4.75 5.25  
Water Pails, 12 qt.....3.00 3.75

**Pans—Dripping—**

Large sizes.....\* doz \$5  
Small sizes.....\* doz \$4

Silver & Co. (Covered).....40¢

**Standard List:**

No.....0 1 2 3 4  
\* doz.....\$3.00 \$3.75 \$4.25 4.75 \$5.25  
\* doz.....\$6.00 \$7.00 \$8.00 \$9.00  
Polished, regular goods.....75¢75¢10¢  
Acme Fry Pans.....60¢5¢

**Dust—**

Steel Edge, No. 1.....\* doz \$1.75

**Roasting and Baking—**

Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.50; 30, \$2.50 each.....60¢10¢

**Paper and Cloth—**

Sand and Emery—  
List April 19, 1886.....50¢10¢60¢  
Sibley's Emery and Crocus Cloth.....30¢

**Parers—**

Apple—  
Advance.....\* doz \$4.50  
Baldwin.....\* doz 5.00  
Bonanza.....each 6.00  
Daisy.....\* doz 3.50  
Eclipse.....\* doz 4.00  
Eureka, 1888.....each 16.00  
Family Bay State.....\* doz 12.00  
Favorite.....\* doz 6.00  
Gold Medal.....\* doz 4.00  
Ideal.....\* doz 27.00  
Little Star.....\* doz 4.00  
Monarch.....\* doz 18.50  
New Lightning.....\* doz 5.50  
Oriole.....\* doz 4.00  
Penn.....\* doz 3.00  
Perfection.....\* doz 4.00  
Reading 73.....\* doz 4.00  
Reading 75.....\* doz 7.00  
Rocking Table.....\* doz 5.50  
Turn Table.....\* doz 18.50  
Victor.....\* doz 4.50  
Waverly.....\* doz 3.75  
White Mountain.....\* doz 4.00

**Pencil Soapstone—**

See Crayons

**Pickers, Fruit—**

Prize Fruit Pickers.....50¢

**Picks—**

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....60¢10¢10¢70¢

**Picture Nails—**

See Nails, Picture.

**Pinking Irons—**

See Irons, Pinking.

**Pins—**

Bow—  
Humason, Beckley & Co.'s.....70¢70¢10¢  
Peck, Stow & W. Co.....60¢60¢10¢  
Sargent & Co.'s, \$17 and.....60¢10¢60¢10¢10¢

**Escutcheon—**

Brass.....\* doz \$1.1885.....70¢  
Iron.....\* doz \$1.1885.....70¢

**Pipe, Wrought Iron**

1 1/2 and under, Plain, list April 18, 1893.....52¢10¢10¢10¢5¢  
1 1/2 and under, Galv.....60¢10¢10¢10¢5¢  
1 1/2 and over, Plain.....87¢10¢10¢10¢5¢  
1 1/2 and over, Galv.....57¢10¢10¢10¢10¢5¢  
Boiler Tubes, list Oct. 24, 1892.....65¢10¢10¢10¢5¢

Casing, list Nov. 16, 1892.....52¢10¢10¢10¢5¢

Cold Drawn Seamless Steel Tubing.....50¢  
Inserted Joints Casing, list Nov. 16, 1892.....47¢10¢10¢10¢5¢  
Steel Boiler Tubes.....27¢10¢10¢10¢5¢

**Planes and Plane Irons—**

Wood Planes—  
Molding.....50¢10¢50¢10¢5¢  
Bench, First quality.....55¢10¢55¢10¢5¢  
Bench, Second quality.....50¢10¢50¢10¢70¢  
Bailey's (Stanley R. & L. Co.).....60¢10¢

**Iron Planes**

Bailey's (Stanley R. & L. Co.).....50¢10¢  
Derby Plane Co.....70¢  
Chapin's Iron Planes.....50¢10¢60¢  
Davis' Iron Planes.....50¢50¢5¢  
Gage Tool Co.'s Self-Setting.....35¢  
Miscellaneous Planes (Stanley R. & L. Co.).....50¢10¢  
Sargent's.....60¢10¢60¢10¢5¢  
Standard Tool Co.....60¢10¢10¢70¢  
Steers' Iron Planes.....50¢10¢50¢10¢5¢

**Plane Irons—**

Auburn Thistle.....30¢10¢30¢10¢10¢  
Buck Bros.....30¢  
Butcher's.....\$5.00 \$5.25 to \$10.00  
Ohio.....30¢10¢30¢10¢10¢  
Stanley R. & L. Co.....50¢10¢  
L. & J. White.....25¢

**Plates—**

Fellow.....\* doz \$6.00

**Pliers and Nippers—**

Button's Patent.....60¢  
Carver's Pat. Wire Cutters.....20¢  
Cronk's 8 in., \$15.00; 10 in.....\$20, 60¢  
Cronk's Button Pattern.....60¢10¢5¢  
Cronk's Carrier Pliers.....60¢60¢5¢  
Eureka Pliers and Nippers.....40¢  
Gas Pliers.....60¢  
Gas Pliers, Custer's Nickel Plated.....60¢5¢  
Hall's Nippers, No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 \* doz.....40¢10¢  
Hall's Pliers.....70¢  
Humason & Beckley Mfg. Co. 60¢60¢10¢  
Lindsey's Giant, No. 55, 6 in., \$10.50.....38¢  
Morris's Pliers.....\* doz \$12.00.....80¢5¢  
P. S. & W. Cast Steel.....50¢50¢5¢  
P. S. & W. Tinner's Cutting Nippers.....10¢  
add 6¢.....35¢  
Russell's Parallel.....25¢  
Waterbury Nip's, 5 in., \* doz, \$7.50, 39¢

**Plumbs and Levels—**

Regular list.....75¢10¢30¢  
Cook's.....40¢10¢  
Davis Inclinometers.....10¢10¢  
Davis Iron Levels.....30¢  
Dixon's.....60¢50¢10¢  
Pocket Levels.....70¢10¢70¢10¢10¢  
Stanley's Duplex.....20¢10¢  
Stanley's Handy.....20¢10¢

**Poachers, Egg—**

Buffalo Steam Egg Poachers, \* doz, No. 1, \$6.00; No. 2, \$9.00.....38¢  
Silver & Co. 3-Ring, \* doz, \$3.60; 5-Ring.....\$1.80

**Pokes Animal—**

Bishop's American.....\* doz \$2.50  
Bishop's I. X. L.....\* doz \$5.25  
Bishop's Steel Monarch.....\* doz \$4.25  
Bishop's Pioneer.....\* doz \$5.25  
Bolding.....\* doz \$5.00  
Buckeye Single Stale.....\* doz \$2.75  
Columbia, Double Stale.....\* doz \$5.50  
Eagle, Double Stale.....\* doz \$5.50  
Eagle, Single Stale.....\* doz \$3.50  
Metallic Horse Pokes.....\* doz \$5.00

**Police Goods—**

Daley's Improved Handcuffs; 3 Hands, Polished, \* doz, \$48.00; 2 Hands, Polished, \* doz, \$57.00; 3 Hands, Polished, \* doz, \$72.00; 2 Hands, Polished, \* doz, \$84.00.....25¢  
J. P. Lovell's Police Goods.....25¢  
Newhall Ship Chandlery Co., Handcuffs, \$15.00 \* doz.....25¢  
Tower's.....25¢

**Polish—**

Metal—  
Gaston's Silver Compound.....38¢  
Prestoline.....38¢  
Prestoline Paste.....38¢  
Tantite Mills:  
Paste, 1/4 lb tins.....\* gr. \$14.40 \* doz \$144.00  
Paste, 1 lb tins.....\* gr. \$36.00 \* doz \$360.00  
Liquid, 4 pint.....\* gr. \$36.00 \* doz \$360.00  
Powder, 1 lb.....\* gr. \$36.00 \* doz \$360.00  
Wynn's White Silk, 1/2 pt. cans \* doz \$1.57

Black Eagle Benne Paste, 5 and 10 lb cans.....12¢  
Black Flag 5 and 10 lb pails.....10¢25¢  
Black Jack Water Paste, 5 and 10 lb cans.....12¢  
Bonelli's Liquid Stove Polish, \* gro \$9.00  
Bonelli's Paste Stove Polish, \* gro \$9.00  
Bornton's No. 1 Day.....\* gro \$7.90  
Crown Paste.....\* gro \$13.00  
Crown Paste in 5 and 10 lb pails.....\* gr \$12  
Diamond O. K. Enamel.....\* gro \$19.00  
Diamond Rock Nickel Cleaner.....\* gro \$10.00

Joseph Dixon's.....\* gro \$10.00  
Dixon's Plumb.....\* gro \$10.00  
Firestone.....\* gro \$10.00  
Gem.....\* gro \$4.50, 10¢  
Gold Medal.....\* gro \$6.00, 25¢  
Japanese.....\* gro \$3.50

**Pullers Nail—**  
Bellevue..... \$ dos. \$24.00, 40%  
Economy..... \$ dos. \$5.50 to \$6.00  
Hutch..... \$ dos. \$10.00  
Plant No. 1..... \$ dos. \$18.00, 10%  
Plant No. 2..... \$ dos. \$15.00, 10%  
Pellcan..... \$ dos. \$9.00, 25%  
Sorrenton..... \$ dos. \$18.00, 8% & \$3% & 10%

**Pulleys—**  
Barnes Saw..... 70%  
Hay Fork, Anti-Friction, 5 in. solid..... \$6.70  
Hay Fork, "B" Common and Patent..... 20%  
Hay Fork, Moore's Anti-Friction 5 in. Wheel..... \$12.00  
Hay Fork, Reed's Self-Lubricating..... 60%  
Hay Fork, Solid Eye..... \$4.00; Swivel, \$4.50  
Hay Fork, Stearns' Nos. 35 & 45..... 50%  
Hay Fork, Stearns' Nos. 15, 25, 55, 60, 65  
Hay Fork, Tarnox Pat. Iron..... 20%  
Hot House, Hanging, &c..... 60%  
Japanned Clothes Line..... 60%  
Japanned Screw..... 70%  
Japanned Side..... 70%  
Moore's Ceiling or End, Anti-Friction..... 60%  
Moore's Dumb Waiter, Anti-Friction..... 60%  
Moore's Electric Light..... 35%  
Moore's Side, Anti-Friction..... 60%  
Sash (Auger Mortise). On Dbl. lot ex. 6%  
Common Sense..... 60%  
Empire..... 60%  
Aome..... 60%  
Ideal, Nos. 2, 4, 10 & 15..... 60% less 1%  
Star..... 60%  
Ideal, or L.I. No. 60..... \$ dos. 22%  
Shade Rack..... 45%  
Shepard's Niagara, No. 25..... \$ dos. 25%  
Tackle Blocks—See Blocks.

**Pumps—**  
Cistern, Best Makers..... 60% & 10% to 70%  
Pitcher Spout, Best Makers..... 70% to 10%  
Pitcher Spout, Cheaper G'ds..... 75% & 10%  
Myers' Pumps, low list..... 60%  
Detroit Valve & Washer Co.'s Pump..... 60%  
Leathers..... \$ gro \$0.00

**Punches—**  
Avery's Revolving..... 40%  
Avery's Sawset and Punch—See Sawset  
Bemis & Call Co.'s Cast Steel Drive..... 60%  
Bemis & Call Co.'s Check..... 55%  
Bemis & Call Co.'s Spring..... 50%  
Bemis & Call Co.'s Springfield Socket..... 35%  
Niagara Hollow Punches..... 20%  
Niagara Solid Punches..... 55%  
Rice Hand Punches..... 60%  
Saddler's or Drive, good..... \$ dos. 60%  
Spring, good quality..... \$ dos. \$2.50 to \$3.00  
Spring, Leach's Pat..... 15%  
Solid Timmers, P., S. & W. Co., \$ dos..... 55%  
Timmers' Hollow Punches, P., S. & W. Co..... 20% & 2%

**Rail—**  
Barn Door, Light, In..... 1/4 3/4 1/2  
Per 100 feet..... \$1.75 2.00 2.75  
B. D. for N. E. Hangers..... 1/4 3/4 1/2  
Per 100 feet..... \$2.00 2.50 3.00  
Carrier, double braced, Steel Rail..... 3/4  
Lundy Parlor Door, Planed Edge..... \$ ft. 7  
Moody Steel Rail..... \$ ft. 5  
Moore's Steel Rail..... 35%  
Sliding Door, Braced, Iron..... \$ ft. 6  
Sliding Door, Iron, Painted..... 60%  
Sliding Door, Wrt. Brass..... \$ ft. 35, 40 & 55  
Terry's Steel Rail..... \$ ft. 4  
Victor Track Rail, 7 1/2 ft. foot..... 60% & 10%

**Rakes—**  
Cast Steel, Association G'ds..... 70% & 5% & 2%  
Cast Steel, outside goods..... 70% & 5% & 2%  
Malleable, good..... 70% & 5% & 2%  
Malleable, low grade..... 75%  
Fort Madison Prize Bow Brace and  
Feetless..... 25%  
Fort Madison Steel Tooth Lawn Rake..... \$ dos. 25%  
Gibbs..... \$ dos. \$4.90  
Gibbs' Aome Lawn Rake..... \$ dos. \$4.75  
Gibbs' Canton Lawn Rake..... \$ dos. \$3.75  
Gibbs' Crown Lawn Rake, No. 1..... \$ dos. \$4.90  
Gibbs' Favorite Lawn Rake..... \$ dos. \$3.90  
Gibbs' Hustler No. 0..... \$ dos. \$4.25  
Gibbs' Hustler No. 1..... \$ dos. \$4.40  
Oneda Lawn Rake..... \$ dos. \$6.00

**Razors—**  
Campbell Cutlery Co..... 50%  
Electric Cutlery Co..... Net prices  
Galvanic..... \$ dos. \$15.00  
Jordan's A. & L. New list..... Net prices  
Jordan's Old list..... Net prices  
J. B. Torrey Razor Co..... Net prices  
Wostenholm and Butcher, \$10 to \$20..... 10%

**Razor Straps—**  
See Straps, Razor.

**Reels—**  
Clothes Line—..... 33% & 10%  
Fishing—  
Hendryx Aluminum, German Silver, Gold, Bronze, Silver Rubber, Popolo and Salmon, Single Action, Multiplying and Quadruple, all sizes..... 25%  
Hendryx Single Action Series, 102P and PN, 202P and PN, 102PR and PN, 202PR and PN, 502 and 502N, 802 and 802N, 02084N, Competitor..... 50%  
Hendryx Multiplying and Quadruple Series, 3004N and PN, 4N and PN, 2004N, 2004P and PN, 002904PN, 0924 and 0924N, 5000N and PN..... 40% & 10%

**Registers—**  
Moore's Bronze Finishes..... 75%  
Moore's Electroplated..... 80%  
Moore's Japanned..... 80%  
Moore's Solid Bronze..... 80%  
Moore's Store Pipe..... 85%

**Rings and Ringers—**  
Bull Rings—  
Hotchkiss' list..... 40%  
Humason, Beckley Co.'s..... 75%  
Peck, Stow & W. Co.'s..... 80% & 10%  
Sargent's..... 80% & 10%  
Hog Rings and Ringers—  
Note.—The market for Hog Rings and Ringers is in a demoralized condition and prices are low and irregular. We therefore withdraw quotations for the present.

**Rivets and Burrs—**  
Copper..... 60% & 10%  
Iron Norway, list Nov. 1, 1894..... 60%  
Second Quality..... 5%

**Rivet Sets—See Sets.**  
**Roasting and Baking Pans—See Pans, Roasting and Baking.**  
**Rods—**  
Stair, Black Walnut..... \$ dos 40%  
Stair, Brass..... 25% & 50%

**Rollers—**  
Aome Moore's Anti-Friction..... 50% & 10%  
Barn Door, Sargent's list..... 60% & 10% & 10%  
Moore's Barn Door Stay..... 60%  
Union Barn Door Roller..... 70%  
Thompson Mfg. Co.'s Lawn Rollers..... 80%

**Rope—**The following prices are L. O. B., New York or factory, and are shaded 1/4% on large lots; terms, 1 1/2% for cash.  
Manila, 7-16 in. diam. and larger..... 8 1/4 & 8 1/4  
Manila, 1/4 in. diam. and larger..... 8 1/4 & 8 1/4  
Manila, 5-16 in. diam. and larger..... 8 1/4 & 8 1/4  
Manila, Tarred Rope..... 7 1/4 & 7 1/4  
Sisal 7-16 in. and larger..... 5 1/4 & 5 1/4  
Sisal..... 5 1/4 & 5 1/4  
Sisal, 1/4 and 5-16 in. diam. and larger..... 5 1/4 & 5 1/4  
Sisal, Hay Rope..... 5 1/4 & 5 1/4  
Sisal, Tarred Rope..... 5 1/4 & 5 1/4  
Sisal-Medium Lath Yarn..... 5 1/4 & 5 1/4  
New Zealand..... 5 1/4 & 5 1/4  
New Zealand, 1/4 inch..... 5 1/4 & 5 1/4  
New Zealand, 1/4 & 5-16 in. diam. and larger..... 5 1/4 & 5 1/4  
New Zealand, Hay Rope..... 5 1/4 & 5 1/4  
New Zealand, Tarred Rope..... 5 1/4 & 5 1/4  
Cotton Rope..... 12 1/2 & 15  
Jute Rope..... 5 1/4 & 6

**Wire Rope—**  
List Sept. 1, 1894. All kinds..... 20% & 2% cash

**Rules—**  
Boxwood..... 80% & 10% & 80% & 10% & 10%  
Ivory..... 60% & 10%  
Sargent's Steel Rules and Straight Edges..... 25% & 10%

**Sad Irons—See Irons, Sad.**  
**Sand and Emery Paper and Cloth—**  
See Paper and Cloth.  
**Sash Cord—See Cord, Sash.**  
**Sash Locks—See Locks, Sash.**  
**Sash Weights—**  
See Weights, Sash.  
**Sausage Stuffers or Fillers—See Stuffers or Fillers.**  
**Saws—**  
Note.—Extra 5% to 10% often given.  
Atkins' Circular..... 50% & 10%  
Atkins' Band..... 50% & 10%  
Atkins' Cross Cut, New list..... 40%  
Atkins' Mulay, Mill and Drag..... 50% & 10%  
Atkins' One-Man Saw..... 40%  
Atkins' Wood Saws..... 40%  
Atkins' Hand Compass, &c..... 40%  
Dixon's Circular..... 45% & 5% & 5%  
Dixon's Cross Cut, list Jan. 1, 1893..... 40% & 10%  
Dixon's Hand..... 25%  
C. E. Jennings & Co.'s..... 25%  
Peace Circular and Mill..... 45% & 5% & 5%  
Peace Cross Cuts, list Jan. 1, 1893..... 45% & 10%  
Peace Hand, Panel and Rip..... 25% & 25% & 5%  
Richardson's Circular and Mill..... 45% & 5% & 5%  
Richardson's Cross Cut, list Jan. 1, 1893..... 45% & 10%  
Richardson's Hand, &c..... 25% & 25% & 5%  
Simonds' Circular Saws..... 45% & 5% & 5%  
Simonds' Crescent Ground Cross Cut Saws..... 30%  
Simonds' One Man Cross Cuts..... 40% & 10%  
Simonds' Gang, Mill, Mulay and Drag Saws..... 45% & 5% & 5%  
Wheler, Crockett & Clemons Mfg. Co. Cross Cuts, list Jan. 1, 1893..... 45% & 10%  
Hand, Panel and Rip..... 30% & 10%  
Woodrough & McFarlin..... 45% & 10%  
Cross Cuts, list Jan. 1, 1893..... 45% & 10%  
Hand, Panel and Rip..... 25% & 10%

**Hack Saws—**  
Eureka and Crescent..... 25%  
Griffin's, complete..... 40% & 10% & 50%  
Griffin's Hack Saw Blades..... 40% & 10% & 50%  
Star Hack Saws and Blades..... 25%

**Scissors—**  
Barber's No. 1, \$3; No. 6, \$10; No. 7, \$15.25%  
Barber's Scissors, complete..... 35%  
Lester, complete, \$10.00..... 35%  
Rogers, complete, \$4.00..... 25%

**Saw Frames—**  
See Frames, Saw.  
**Saw Sets—See Sets, Saw.**  
**Saw Tools—See Tools, Saw.**  
**Scale Beams—**  
See Beams, Scale.  
**Scales—**  
Chattillon's Eureka..... 25%  
Chattillon's Favorite..... 40%  
Chattillon's Grocers' Trip Scales..... 50%  
Family, Turnbills..... 30% & 80%  
Hatch, Counter, No. 171, good quality..... \$ dos \$17.00 to \$18.00  
Hatch Tea, No. 181..... \$ dos \$6.00 to \$6.50  
Riehle Bros' Platform..... 40% & 10% & 10%  
Union Platform Plain..... \$2.00 to \$2.10  
Union Platform, Striped..... \$2.15 to \$2.25  
Standard..... 25%

**Scissors, Fluting—**  
See Scissors.  
**Saw Sets—See Sets, Saw.**  
**Saw Tools—See Tools, Saw.**  
**Scale Beams—**  
See Beams, Scale.  
**Scales—**  
Chattillon's Eureka..... 25%  
Chattillon's Favorite..... 40%  
Chattillon's Grocers' Trip Scales..... 50%  
Family, Turnbills..... 30% & 80%  
Hatch, Counter, No. 171, good quality..... \$ dos \$17.00 to \$18.00  
Hatch Tea, No. 181..... \$ dos \$6.00 to \$6.50  
Riehle Bros' Platform..... 40% & 10% & 10%  
Union Platform Plain..... \$2.00 to \$2.10  
Union Platform, Striped..... \$2.15 to \$2.25  
Standard..... 25%

**Scissors, Fluting—**  
See Scissors.  
**Saw Sets—See Sets, Saw.**  
**Saw Tools—See Tools, Saw.**  
**Scale Beams—**  
See Beams, Scale.  
**Scales—**  
Chattillon's Eureka..... 25%  
Chattillon's Favorite..... 40%  
Chattillon's Grocers' Trip Scales..... 50%  
Family, Turnbills..... 30% & 80%  
Hatch, Counter, No. 171, good quality..... \$ dos \$17.00 to \$18.00  
Hatch Tea, No. 181..... \$ dos \$6.00 to \$6.50  
Riehle Bros' Platform..... 40% & 10% & 10%  
Union Platform Plain..... \$2.00 to \$2.10  
Union Platform, Striped..... \$2.15 to \$2.25  
Standard..... 25%

**Coach, Lag and Hand-Rail—**  
Lag, Blunt Point, list Jan. 1, 1890..... 85% & 85% & 10%  
Coach and Lag, Gimlet Point, list Jan. 1, 1890..... 80% & 20% & 5%  
Hand Rail, Am. Saw Co..... 80%  
Hand Rail, H. & B. Mfg. Co..... 75% & 75% & 5%  
Hand Rail, Sargent's..... 70% & 10% & 10%

**Jack Screws—**  
Millers Falls..... 50% & 10% & 10%  
Millers Falls, Roller..... 50% & 10%  
P., S. & W..... 35%  
Sargent..... 70% & 10% & 10%  
Stearns..... 40% & 10%  
Tatum's..... 25% & 10%

**Cork—**  
Detroit Cork Screw Co..... 33%  
Humason & Beckley Mfg. Co..... 40% & 10% & 50%  
Williamson's..... 38% & 38% & 5%  
Williamson's Forged Worm, Applewood Handle, \$ dos., \$5.00; Rosewood, \$5.50..... 40%

**Machine—**  
List August 1, 1894.  
Flat Head Iron..... 45%  
Round Head Iron..... 40%

**Wood—**  
List January 1, 1891.  
Flat Head Iron..... 85%  
Round Head Iron..... 75%  
Flat Head Brass..... 75%  
Round Head Brass..... 75%  
Flat Head Bronze..... 75%  
Round Head, Bronze..... 75%  
Rogers' Drive Screws..... 87%  
Scroll Saws—See Saws, Scroll.  
**Scythes—**  
See Scythes, Scythes.  
**Sets—**  
Aiken's Sets, Aylis and Tools..... 60% & 60% & 25%  
Common Brad Sets..... 60%  
No. 42, \$10.50; No. 43, \$12.50..... 70% & 10% & 5%  
Fray's Adj. Tool Hdlrs. Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7..... 50%  
Henry's Combination Haft..... \$ dos \$6.00  
Millers Falls Adj. Tool Hdlrs. No. 1, \$12; No. 4, \$12; No. 5, \$13..... 25%  
Stanley's Excelsior..... \$ dos. \$1.75 to \$2.00; No. 2, \$4.00; No. 3, \$5.50..... 30% & 10%

**Nail—**  
Round..... \$ gr. \$3.25  
Square..... \$ gr. \$4.00  
Buck Bros..... \$ gr. \$4.00  
Cannon's Diamond Point..... \$ gr. \$12.25

**Rivet—**  
Regular list..... 70%

**Saw—**  
Atkins' Criterion..... \$ dos No. 1, \$3.00  
Atkins' Genuine..... \$13.00, 50% & 10% & 60%  
Atkins' Imitation..... \$ dos \$3.00 to \$3.25  
Atkins' Lever..... \$ dos No. 1, \$3.00  
Avery's Saw Set and Punch..... 50%  
Bemis & Call Co.'s Cross Cut..... 30% & 5%  
Bemis & Call Co.'s Pile Co.'s..... 20%  
Bemis & Call Spring Hammer..... 20%  
Common Lever..... \$ dos \$2.00, 45% & 50%  
Crescent..... \$ dos \$3.00  
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00..... 40% & 10% & 50%  
Dixon's Saws..... 25% & 25% & 10%  
Hammer, Botsch, Pile Co.'s new Pat. 45%  
Hammer, Hotchkiss..... \$5.50, 40%  
Hart's Pat. Lever..... 20%  
Kohler's Giant Royal..... \$ dos \$12.00  
Kohler's Royal..... \$ dos \$7.00  
Leach's, No. 0, \$8.00; No. 1, \$15..... 15% & 20%  
Leopold..... \$ dos \$15.00 to \$16.00  
Lloyd's..... \$ dos \$15.00, 40% & 10%  
Morrell's No. 1, \$15.00..... 40% & 20%  
Nos. 3 and 4, Cross Cut, \$23.00..... 40% & 20%  
No. 5, Mill, \$31.00..... 40% & 20%  
No. 10, \$15.50..... 40% & 20%  
No. 11, \$18.00..... 40% & 20%  
Nash's..... 20% & 10% & 40%  
Stillman's Genuine..... \$ dos \$5.00 to \$7.75

**Stillman's Pattern, Hand, \$ dos \$3.25; Cross Cut, \$6.50..... 55% & 55% & 10%  
Taintor Positive..... \$ dos \$18.00**

**Sharpeners, Knife—**  
Parkin's.....  
Applewood Handles..... \$ nos. \$6.00, 50%  
Rosewood or Cocobola..... \$ dos. \$9.00 50%  
Tantle Mills..... \$ gr. \$11.40..... 25% & 33% & 4%

**Shaves, Spoke—**  
Wood..... 45%  
Bailey's (Stanley R. & L. Co.)..... 50% & 10%  
Cincinnati..... 25% & 10%  
Goodell's..... \$ dos. \$9.00..... 25%  
Stearns..... 40% & 10%  
Tatum's..... 25% & 10%

**Shears—**  
Aome Cast Shears..... 40% & 40% & 5%  
American (Cast) Iron..... 75% & 10% & 50% & 5%  
Barnard's Lamp Trimmers..... \$ dos. \$3.75  
Barnard, Solid Steel Blade, Jap'd..... 75%  
Barnard, Solid Steel Blade, Nickled..... 65%  
Cast Steel Trimmers:  
First quality..... 80% & 10% & 80% & 10% & 10%  
Second quality..... 80% & 10% & 80% & 10% & 10%  
Campbell Cutlery Co., Jap'd..... 75%  
Nickel Plated..... 65%  
Clausen brand, Japanned..... 70%  
Clausen brand, Nickled, same list..... 60%  
Clipper..... 10% & 10% & 10% & 10% & 10%  
Davenport Co. Jap'd..... 80% & 80% & 10%  
Dixie Cast Shears..... 10% & 10% & 10% & 10% & 10%  
Eclipse Cast Shears..... 40% & 10% & 50%  
Eclipse Cast Shears..... \$ dos. \$1.00, \$1.00, \$1.00  
Hatch Cutlery Co. Solid Steel Forged..... 60% & 60% & 10%

**Reinisch's, List Dec. 1891..... 60% & 10% & 10% & 10% & 10%  
Reinisch's Tailor's Shears..... 33% & 33% & 5%  
Howe Bros. & Hulbert, Solid Forged Steel..... 40%  
Seymour's, List Dec. 1891..... 60% & 10% & 80% & 10% & 10% & 10%  
Victor Cast Shears..... 75% & 10% & 80%**

**Timmers' Snips—**  
Cast Handles, Laid with Steel..... 40%  
Nikangas Snips and Shears..... 20% & 10%  
Steel Laid, Clausen..... 70%  
Wrt. Handles, Steel Blades..... 20% & 10%

**Pruning Shears and Hooks—**  
Dixon's Combined Pruning Hook and Saw..... \$ dos. \$18.00, 25% & 25% & 10%  
Dixon's Pruning Hook..... \$ dos. \$12.00  
Dunlap's Saw and Chisel..... \$ dos. \$2.50, \$3.00  
Eagle Pruning Shears..... 50% & 10% & 5%  
Henry's Pruning shears..... \$ dos. \$4.00, \$4.40, \$4.25

**Henry's Tree Pruner..... 50% & 20%  
Levin Pruner No. 1, \$15.00 \$ dos. 40% & 5%  
Levin Pruner No. 2, \$21.00 \$ dos. 40% & 5%  
J. Mallinson & Co. No. 1, \$5.25; No. 2, \$7..... 60%  
No. 100 Pruning Shear..... \$ dos. 60%  
Pruning Shears, Henry's Pat..... \$ dos. 60%  
Pruning Shears, Conn. Pat..... \$ dos. 60% & 30%  
P. S. & W. Co..... \$ dos. 60%  
Telegraph Tree Pruner..... 60% & 10%  
Waters' Tree Pruner..... 80%  
Wheeler, M. & C. Co., Combination..... \$ dos \$12.00**

**Timmers' &c.—**  
Shells and Snips (P. S. & W.)..... 80% & 25%  
Snips, J. Mallinson & Co..... 80% & 25%

**Shaves—**  
**Sliding Door—**  
Corbin's list..... 60% & 10% & 35%  
M. W. Co., list July, 1888..... 50% & 10% & 60% & 5%  
Moore's Anti-Friction..... 60%  
Patent Roller..... 60% & 10% & 25%  
Patent Roller, Hatfield's..... 75%  
R. & E., list Dec. 18, 1885..... 55% & 30%  
Russell's Anti-Friction, list Dec. 18, 1885..... 60% & 25%

**Sliding Shutter—**  
Reading list..... 60% & 10% & 10%  
R. & E., list Dec. 18, 1885..... 60% & 10% & 25%  
Sargent's list Dec..... 70%

**Shells—**  
Brass Shot Shells, Club, Rival, Climax..... 65% & 25%  
First quality 4, 8, 10 and 12 gauge..... 60% & 25%  
First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list)..... 20% & 10% & 25%  
Price..... 40% & 25%  
Smokeless brand, 12, 10, 16 gauge..... 35% & 10% & 35%  
Star, Club, Rival and Climax Brands..... 35% & 10% & 35%  
Trap brand, 12 and 10 gauge..... 35% & 10% & 35%

**Shells, Loaded—**  
Standard List, July 19, 1890..... 40% & 10% & 10% & 10% & 10%  
L. & I. J. White..... 30% & 5%

**Ship Tools—**  
Shoes, Horse Mule, &c.—  
Horse—  
Burden's, Perkins', Phoenix, Standard, Shoenberger's, Diamond State, Old Dominion Brydens Boss and Crescent, from jobbers..... \$1.40 to \$1.75  
Bryden's Frog measure..... \$4.00

**Mule—**  
Add 50 cents per keg to above prices.

**Ox Wrought—**  
Ton lots..... \$ dos \$8  
1000 lb lots..... \$ dos \$8  
500 lb lots..... \$ dos \$8

**Shot—**  
July 27. Small lots.  
Drop, up to B, 25-b bag..... \$1.15  
Drop, up to B, 5-b bag..... .30  
Drop, B and larger, 25-b bag..... 1.40  
Drop, B and larger, 5-b bag..... .35  
Buck and Chilled, 25-b bag..... 1.40  
Buck and Chilled, 5-b bag..... .35  
Dust Shot, 25-b bag..... 1.75  
Dust Shot 5-b bag..... .40

**Shovels and Spades—**  
Ames' Shovels, Spades, &c., list Nov. 1, 1885 (Except Nos. named below)..... 20%  
The following Nos. are subject to a discount of 27 1/2%: Nos. 543 to 572; 833 to 880; and Nos. 1004, 1009, 1014, 1019, 1024, 1027 and 1029.  
Griffith's Black Iron..... 60% & 10%  
Griffith's C. S..... 60% & 10% & 5%  
Griffith's Solid C. S. R. Goods..... 30%  
Hubbard & Co., Antrim list..... 25%  
Hubbard & Co., Chisholm Pattern..... 50% & 10% & 5%  
Hussey, Blane & Co..... 15% & 25%  
H. M. Myers Co..... 30%  
Lehigh Mfg. Co..... 50% & 10%  
St. Louis Shovel Co..... 30% & 20% & 5%  
Remington's (Lowman's) Pat..... 10% & 10% & 5%  
Rowland's Black Iron..... 60% & 10% & 10% & 5%  
Rowland's Steel..... 60% & 10% & 10%  
Terre Haute Shovel & Tool Co..... 50%  
Wyoming Shovel Works..... 40%

**Shovels and Tongs—**  
Brass Head..... 80% & 10% & 5%  
Iron Head..... 60% & 10% & 10% & 5%

**Sieves and Sifters—**  
A. & W. Sifters..... \$ gr \$15.00  
Buffalo Metallic, S. S. & Co..... 50% & 25% & 50%  
Electric Light..... \$ dos \$1.50; \$ gr \$1.50  
Hunter's Genuine..... \$ dos \$1.75; \$ gr \$1.50  
Hunter's Imitation..... \$ dos \$1.00; \$ gr \$1.00  
Mann's Tin Rim..... \$ dos \$1.00; \$ gr \$1.00  
Shaker (Barley's Pat.) Flour sifter..... \$ gr \$21.00

**Sieves, Wooden Rim—**  
Iron Plated..... 80% & 10% & 5%  
Iron Head..... 60% & 10% & 10% & 5%  
Meah 18, Nested, \$ dos..... \$0.70 \$0.95  
Meah 20, Nested, \$ dos..... .90 1.05  
Meah 24, Nested, \$ dos..... 1.05 1.20

**Sinks Cast Iron—**  
Standard list..... 65% & 10% & 70%  
**Wrought Steel—**  
Columbus, Galvanized and enameled..... 50% & 10%  
Columbus Painted..... 30% & 10%  
New Era, Painted..... 50% & 5%  
New Era Galvanized and Enameled..... 70% & 5%

**Skins, Thimble—**  
Waters' list..... 75% & 5% & 10%  
Coldbrookdale Iron Co..... 60%  
Columbus Wrt. Steel, Special net price  
Seneca Falls Pattern..... 75%  
Utica P. S. T. Skins..... 60%  
Utica Turned and Fitted..... 35%

**Slates—**  
School, by case..... 80% & 50% & 10%  
Large lots..... 50% & 10% & 10% & 10%  
**Saw Cutters—See Cutters.**  
**Sleds Hand—**  
Tubular Steel..... \$ dos. \$24.00, 40% & 25%  
Lots of 5 dos. 5%

**Snaps, Harness, &c.—**  
Anchor (T. & S. Mfg. Co.)..... 55%  
Andrews..... 50%  
Cover's Saddlery Wks Triumphant..... 33% & 5%  
Covered Spring..... 50% & 10% & 5%  
Covert..... 60% & 10% & 5%  
Covert, New Patent..... 60% & 10% & 5%





**Silver Plated, Hollow-**  
4 mo. or 5¢ cash in 30 days.  
Meriden Britannia Co. .... 40¢  
Reed & Barton ..... 40¢  
Rogers & Brother ..... 40¢  
Simpson, Hall, Miller & Co. .... 40¢  
Hartford Silver Plate Co. .... 40¢  
William Rogers Mfg. Co. .... 40¢

**Washers-**  
Size hole..... 5-16 3/4 1/2 5/8 3/4 1 1/4  
Washers..... 4.80 3.90 2.55 2.30  
In lots less than 500, \$ 2, add 1/2¢, 1/4¢  
boxes 1¢ to list.

**Whips**  
American Whip Co.: Length. 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 ft.  
X. L. Whalebone Drivins..... \$18.00 20.00 22.00 24.00 27.00 30.00 35.00 36.00  
Eureka, Two-thirds Whalebone..... 15.00 16.50 18.00 20.00 .....  
Bull Bone, Half-length Whalebone..... 11.00 12.00 13.00 15.00 .....  
American Standard..... 5.00 5.50 6.00 6.50 7.00 7.50 8.00 8.50  
True Grip, Raw Hide Center..... 6.00 6.00 .....  
New Name, Stocked Java, Black and Wine Colors..... 6.00 .....  
Americans, 88 Pen Whip..... 6.00 .....  
Gents' Light Driving No. 111..... 6.00 .....  
Gents' Light Driving No. 106..... 6.00 .....  
Hand-made Stocked Java No. 108..... 8.75 4.00 .....  
A large variety of cheaper grades..... \$3.00 \$3.50  
Team Whips..... \$2.00 \$2.50  
Toy Whips..... \$1.00 \$1.50  
Hardware Assortment, 10/American, 75 Whips for \$50.00.

**Wire and Wire Goods-Iron**  
Market.  
Br. & Ann., Nos. 0 to 18.  
Cop'd, Nos. 0 to 18.  
Galv., Nos. 0 to 18.  
Tin'd, Nos. 0 to 18.  
Extra 5¢/10¢ often given and low net prices offered made on large lots.  
**Wheels Well-**  
Br. and Ann'd.  
Nos. 12 to 18.  
Nos. 19 to 25.  
Nos. 26 to 35.  
Annealed Wire on Spools.  
Brass, list Jan. 18, 1884.

### Washer Cutters-

See Cutters, Washers.

### Water Coolers-

See Coolers, Water.

### Wedges-

Iron..... \$ 2 1/2 @ 3 1/2  
Steel..... \$ 5 @ 5 1/2

### Weights Cash-

Ton lots at factory..... \$14.00 @ \$15.00  
Small lots at factory..... 15.00 @ 16.00

### Well Buckets Galvan-

ized-See Pails, Galvanized.

Cast Steel Wire..... 50¢  
Copper, list Jan. 18, 1884..... 40¢  
Galvanized Fence..... 75¢  
Malin's An'led & Tin'd on Spools..... 60¢  
Malin's Brass and Cop. on Spools..... 50¢  
Steel Music Wire, 18 to 30, imported..... 60¢  
Stub's Steel Wire..... 35¢  
Tate's Spooled, Tin'd & Annealed..... 60¢  
Tate's Spooled Cop. and Brass..... 50¢  
Tinned Broom Wire, 18 to 21, \$ 2..... 45¢  
Wire Clothes Line, see Lines.  
Wire Picture Cord, see Cord.

### Bright Wire Goods-

Standard list..... 90¢ @ 90¢ 15¢

### Wire Cloth and Netting-

Galvanized Wire Netting..... 80¢ @ 80¢ 10¢  
Painted Screen Cloth 100 ft \$1.40 @ \$1.45

### Wire Barb-

See Trade Report.

### Wire Rope-See Rops, Wrs.

### Wrenches-

American Adjustable..... 40¢ @ 40¢ 10¢  
Baxter's..... 60¢ @ 60¢ 10¢  
Coe's Genuine..... 60¢ @ 60¢ 10¢  
Coe's "Mechanics"..... 50¢ @ 50¢ 10¢  
Girard Standard..... 65¢ @ 65¢ 10¢  
Lamson & Sessions' Engineers'..... 70¢ @ 70¢ 10¢  
Lamson & Sessions' Agricultural..... 75¢ @ 75¢ 10¢  
P. S. & W. Agricultural..... 80¢ @ 80¢ 10¢  
W. & B. Diamond..... 50¢ @ 50¢ 10¢  
Acme, Bright..... 50¢ @ 50¢ 10¢

Acme, Nickel..... 40¢ @ 40¢ 10¢  
Allison's Pocket (Bright)..... 85¢ @ 85¢ 10¢  
Alligator..... 60¢ @ 60¢ 10¢  
Always Ready..... 35¢ @ 35¢ 10¢ @ 40¢ 10¢

### Bemis & Call's:

Adjustable S..... 35¢ @ 35¢ 10¢  
Brigg's Pattern..... 30¢ @ 30¢ 10¢  
Combination Black..... 40¢ @ 40¢ 10¢  
Combination Bright..... 40¢ @ 40¢ 10¢  
Cylinder or Gas Pipe..... 45¢ @ 45¢ 10¢  
Extra Heavy..... 45¢ @ 45¢ 10¢  
Morrick's Pattern..... 45¢ @ 45¢ 10¢  
No. 3 Pipe Bright..... 45¢ @ 45¢ 10¢  
Bit Wrench, Adj., Tatum's..... 25¢ @ 25¢ 10¢

### Boardman's

Boardman's..... 30¢ @ 30¢ 10¢  
Cincinnati Brace Wrenches..... 25¢ @ 25¢ 10¢  
Diamond Steel..... 55¢ @ 55¢ 10¢  
Donohue's Engineer..... 20¢ @ 20¢ 10¢  
Eagle..... 50¢ @ 50¢ 10¢  
Hercules..... 70¢ @ 70¢ 10¢  
Tate's Vise Wrench..... 55¢ @ 55¢ 10¢  
Tatum's Brace..... 25¢ @ 25¢ 10¢  
The Favorite Pocket, \$ 2 @ \$4..... 40¢ @ 40¢ 10¢  
Walker's..... 55¢ @ 55¢ 10¢  
Webster's Pat. Combination..... 25¢ @ 25¢ 10¢

### Wringers, Clothes-

In lots of less than one dozen.

Am. Wringer Co.'s list July 2, '94. 2¢ cash  
Colby Wringer Co.'s list May 1, '94. 2¢ cash  
Lovell Mfg. Co., list July 2, 1892. 2¢ cash  
Peerless Mfg. Co., list Feb., 1892. 2¢ cash  
National Wringer & Mfg. Co., list June 1, 1892. 2¢ cash

### Wrought Goods-

Staples, Hooks, &c., list, March 17, 1892. 85¢ @ 85¢ 90¢

## Paints, Oils and Colors.-Wholesale Prices.

### Animal and Vegetable Oils-

Linseed, City, raw.. per gal. 54 @ ..  
Linseed, City, boiled..... 57 @ ..  
Linseed, Western, raw..... 63 @ 64  
Lard, City, Extra Winter..... 63 @ ..  
Lard, City, Prime..... 63 @ 63  
Lard, City, Extra No. 1..... 43 @ 48  
Lard, City, No. 1..... 43 @ 45  
Lard, Western, prime..... 62 @ 63  
Cotton-seed, Crude, prime..... 26 @ 27  
Cotton-seed, Crude, off grades..... 25 @ 25  
Cotton-seed, Summer Yellow, prime..... 31 @ 32  
Cotton-seed, Summer Yellow, off grades..... 30 @ 31  
Sperm, Crude..... 58 @ ..  
Sperm, Natural Spring..... 61 @ ..  
Sperm, Bleached Spring..... 61 @ ..  
Sperm, Natural Winter..... 63 @ ..  
Sperm, Bleached Winter..... 63 @ ..  
Whale, Crude..... 32 @ 33  
Whale, Natural Winter..... 41 @ 42  
Whale, Bleached Winter..... 44 @ 46  
Whale, Extra Bleached..... 46 @ 47  
Sea Elephant, Bleached Winter..... 20 @ 21  
Menhaden, Crude, Sound..... 20 @ 21  
Menhaden, Crude, Southern..... 25 @ 26  
Menhaden, Light Pressed..... 33 @ 34  
Menhaden, Bleached W'ter..... 51 @ 52  
Tallow, City, prime..... 50 @ ..  
Tallow, Western, prime..... 50 @ ..  
Cocconut, Ceylon..... 54¢ @ 54¢  
Cocconut, Cochiti..... 54¢ @ 54¢  
Cod, Domestic..... 30 @ 30  
Cod, Foreign..... 30 @ 30  
Red Elaine..... 35 @ 36  
Red Saponified..... 44¢ @ 44¢  
Bank..... 24 @ 26  
Strait..... 25 @ 27  
Olive, Italian, bbls..... 50 @ 58  
Neatsfoot, prime..... 50 @ 52  
Palm, prime, Lagos..... 54¢ @ 54¢

### Mineral Oils-

Black, 20 gravity, 25 @ 30  
cold test..... 64¢ @ 74¢  
Black, 20 gravity, 15 cold test..... 7 @ 8  
Black, 20 gravity, summer..... 54¢ @ 64¢

Cylinder light, filtered..... 12 @ 16  
Cylinder, dark, filtered..... 10 @ 13  
Paraffine, 23 1/2 @ 24 gravity..... 11 @ 13  
Paraffine, 25 gravity..... 9 1/2 @ 10 1/2  
Paraffine, 28 gravity..... 7 1/2 @ 7 1/2  
Paraffine, red..... 9 1/2 @ 10 1/2

### Paints and Colors-

Barytes, Foreign, 1 ton..... \$22.00 @ 24.00  
Barytes, Amer. floated..... 20.00 @ 22.00  
Barytes, Amer. No. 1..... 18.00 @ 18.00  
Barytes, Amer. No. 2..... 13.00 @ 15.00  
Barytes, Amer. No. 3..... 11.00 @ 12.00  
Blue, Celestial..... 6 @ 8  
Blue, Chinese..... 40 @ 50  
Blue, Prussian..... 25 @ 40  
Blue, Ultramarine..... 8 @ 25  
Brown, Spanish..... 1 1/2 @ 1 1/2  
Brown, Vandyke, Amer..... 3 @ 3 1/2  
Brown, Vandyke, English..... 6 @ 8  
Carmin, No. 40, in bulk..... 2.00 @ ..  
Carmin, No. 40, in boxes or barrels..... 2.10 @ ..  
Chalk, in bulk..... 8.00 @ 8.00  
Chalk, in bbls. \$ 100..... 33 @ 40  
China Clay, English..... 10 @ 10  
Cobalt Oxide, prep'd..... 13.00 @ 18.00  
Cobalt Oxide, black..... 9.00 @ 11.00  
Cobalt Oxide, black..... 1.90 @ ..  
less 100 lb..... 1.96 @ ..  
Green, Paris, in bulk..... 2 @ 23  
Green, Paris, 170 @ 175 lb..... 2 @ 23 1/2  
Green, Paris, small pack..... 25 @ 29 1/2  
Rebates..... 3¢ @ 3¢ on lots of 10,000 lb or over; 2 1/2¢ on 4,000 to 10,000 lb; 2¢ on 2,000 to 4,000 lb; 1 1/2¢ on 1,000 to 2,000 lb; 1¢ on 500 to 1,000 lb purchased during the season.  
Green, Chrome, ordinary..... 6 @ 12  
Green, Chrome, pure..... 22 @ 25  
Lead, Eng. B.B. white..... 5 1/2 @ 5 1/2  
Lead, Amn. White..... 4 @ 4 1/2  
Dry..... 4 @ 4 1/2  
In Oil..... 5 1/2 @ 5 1/2  
Lead, White, in oil, 25 lb tin pails, add to keg price..... 1 @ 1 1/2  
Lead, White, in oil, 12 1/2 lb tin pails, add to keg price..... 1 @ 1  
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price..... 2 1/2 @ 2 1/2

Lead, Red, kegs..... 4 1/2 @ 5  
Litharge, kegs..... 4 1/2 @ 5  
Litharge, bbls. and 1/2 bbls..... 5 @ ..  
Ocher, Rochelle..... 1.35 @ 1 1/2  
Ocher, French Washed..... 1 1/2 @ 1 1/2  
Ocher, German Washed..... 1 1/2 @ 1 1/2  
Ocher, American..... 1 1/2 @ 1 1/2  
Orange Mineral, French..... 10 @ 10 1/2  
Orange Mineral, German..... 7 1/2 @ 8  
Orange Mineral, American..... 7 1/2 @ 8  
Red, Indian, English..... 5 @ 15  
Red, Indian, American..... 2 @ 5  
Red, Turkey..... 9 @ 10  
Red, Venetian, American..... 7 @ 10  
Red, Venetian, English..... 1.10 @ 1.35

Sienna, Italian, Burnt and Powder..... 4 @ 5  
Sienna, Ital., Burnt Lumps..... 1 1/2 @ 1 1/2  
Sienna, Ital., Raw, Powder..... 4 1/2 @ 5  
Sienna, Ital. Raw, Lumps..... 1 1/2 @ 1 1/2  
Sienna, American, Raw..... 1 1/2 @ 1 1/2  
Sienna, American, Burnt and Powdered..... 1 1/2 @ 1 1/2  
Talc, French..... 1 1/2 @ 1 1/2  
Talc, American..... 1 1/2 @ 1 1/2  
Terra Alba, English..... 65 @ 75  
Terra Alba, American No. 1..... 65 @ 75  
Terra Alba, American No. 2..... 45 @ 50  
Umber, Turkey, Burnt and Powdered..... 2 1/2 @ 3 1/2  
Umber, Turkey, Raw and Powdered..... 2 1/2 @ 3 1/2  
Umber, Turkey, R'w Lumps..... 2 1/2 @ 3 1/2  
Umber, Turkey, Bnt. Amer..... 1 1/2 @ 1 1/2  
Umber, Turkey, R'w Amer..... 1 1/2 @ 1 1/2  
Yellow, Chrome..... 10 @ 25  
Vermilion, American Lead..... 11 @ 12  
Vermilion, Quicksilver, bulk..... 55 @ ..  
Vermilion, Quicksilver, bags..... 55 @ ..  
Vermilion, Quicksilver sm't pkgs..... 60 @ 65  
Vermilion, English Import..... 60 @ 65  
Vermilion, Imitation, Eng..... 8 @ 30  
Vermilion, Trieste..... 80 @ 95  
Vermilion, Chinese..... 85 @ 100  
Whiting Common, \$ 100..... 40 @ 45  
Whiting Gliders..... 50 @ 55  
Zinc, American, dry..... 3 1/2 @ 4 1/2  
Zinc, French, Red Seal..... 7 @ 7 1/2

Zinc, French, Green Seal..... 8 1/2 @ 9  
Zinc, French, V. M. X..... 6 @ 7  
Zinc, Antwerp, Red Seal..... 6 @ 6 1/2  
Zinc, Antwerp, Green Seal..... 6 1/2 @ 7 1/2  
Zinc, German, L. Z. O..... 5 @ ..  
Zinc, V. M. in Poppy Oil, Seal, lots of 1 ton and over..... 10 1/2 @ ..  
Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over..... 9 1/2 @ ..  
lots of less than 1 ton..... 10 1/2 @ ..  
Discounts.-French Zinc.-Discounts to buyers of 10 bbl. lots of one or assorted grades, 15¢ 25 bbls., 2¢ 50 bbls., 4¢. No discount allowed on less than bbl. lots.

### Colors in Oil-

Black, Drop, Frankfurt..... 25 @ 30  
Black, Drop, English..... 12 @ 15  
Black, Drop, Domestic..... 7 @ 10  
Black, Lampblack, Best..... 20 @ 35  
Black, Lampblack, Common..... 7 @ 13  
Black, Ivory..... 8 @ 15  
Blue, Chinese..... 35 @ 40  
Blue, Prussian..... 20 @ 45  
Blue, Ultramarine..... 12 @ 18  
Brown, Vandyke..... 7 @ 12  
Green, Chrome..... 8 @ 18  
Green, Paris..... 16 @ 18  
Sienna, Raw..... 7 @ 14  
Sienna, Burnt..... 7 @ 14  
Umber, Raw..... 7 @ 10  
Umber, Burnt..... 7 @ 10

### Putty-

In barrels and 1/2 bbls..... 0 1/2¢ @ 0 1/2¢  
In tubs..... 0 1/2¢ @ 0 1/2¢  
In tin cans..... 0 1/2¢ @ 0 1/2¢  
In bladders..... 0 1/2¢ @ 0 1/2¢

### Spirits Turpentine-

In regular bbls..... 28 @ 28  
In machine bbls..... 28 1/2 @ 28 1/2

### Glue-

Low Grade..... 7 @ 9  
Cabinet..... 11 @ 14  
Medium White..... 12 @ 14  
Extra White..... 16 @ 20  
French..... 10 @ 25  
English..... 10 @ 25  
Irish..... 10 @ 12 1/2

# THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

### RATES OF SUBSCRIPTION: INCLUDING POSTAGE.

#### UNITED STATES AND BRITISH AMERICA.

Weekly Edition, Issued every Thursday morning..... \$4.50 a year.

Semi-Monthly Edition, First and Third THURSDAYS of every month..... 2.30 "

Monthly Edition First THURSDAY of every month..... 1.15 "

#### ALL OTHER COUNTRIES.

Per Annum, Postpaid.

Weekly Edition: \$5.00=£1=25 francs=20 marks=11 florins=6 roubles (coin)=25 lire=20 pesetas.

Semi-Monthly Edition: \$2.50=£10=12 1/2 francs=10 marks=6 florins=3 roubles (coin)=12 1/2 lire=10 pesetas.

Monthly Edition: \$1.25=£5=6 1/2 francs=5 marks=3 florins=1 1/2 roubles (coin)=6 1/2 lire=5 pesetas.

### RATES OF ADVERTISING: ONE SQUARE (12 LINES, ONE INCH)

ONE INSERTION..... \$2.00

ONE MONTH..... 7.50

THREE MONTHS..... 17.50

SIX MONTHS..... \$30.00

ONE YEAR..... 50.00

Rates for larger spaces quoted on application

New York (Main Office), 96-102 Reade Street,  
Philadelphia, 220 South Fourth Street,  
Pittsburgh, Room 509, Hamilton Building,  
Chicago, 59 Dearborn Street, cor. Randolph,  
Cincinnati, Rooms 22-24 Pickering Building,  
St. Louis, Bank of Commerce Building,  
Boston, 146 Franklin Street,  
Cleveland, 312 The Cuyahoga,  
DAVID WILLIAMS, Publisher  
THOMAS HOBSON, Manager.  
ROBERT A. WALKER, Manager.  
J. K. HANES, Business Manager.  
Geo. W. COPE, Resident Asso. Ed.  
HENRY SMITH, Manager.  
H. H. ROBERTS, Manager.  
WALTER C. ENGLISH, Manager.  
EZRA S. ADAMS, Manager.

BRITISH AGENCY: Office of The Ironmonger, 42 Cannon St., London.

AUSTRALIAN OFFICES: Melbourne, 231 Elizabeth St.; Sydney, 3 Wynyard St.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS, on any banking house in the United States or Europe, or by P. O. Money Order on New York. Where these cannot be obtained, postage stamps of any country will be received.

Newspapers or Bookellers in any part of the world may obtain The Iron Age through The American News Company, New York, S. A. The International News Company, New York, U. S. A., and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A.

Entered at the Post Office, New York, as Second-Class Matter.





---

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google<sup>TM</sup> books

<https://books.google.com>

